FLIGHT

The AIRCRAFT ENGINEER & AIRSHIPS

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Founder and Editor : STANLEY SPOONER

A Journal devoted to the Interests, Practice, and Progress of Aerial Locomotion and Transport

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DIARY OF FORTHCOMING EVENTS

Club Secretaries and others desirous of announcing the dates of important fixtures are invited to send particulars for inclusion in this list :—

1927

June 30 .... Aviation Ball at May Fair Hotel
July 2 .... Royal Air Force Display, Hendon.
July 2 .... No. 20 Sqdn. R.A.F. Reunion Dinner at Gatti's.
July 9 .... Air League Challenge Cup at Castle Bromwich, Birmingham.
July 9 .... Scarborough Air Pageant, under auspices of Yorkshire Aeroplane Club.
July 15 .... Entries Close for King's Cup Air Race.
July 30 .... King's Cup Air Race.
Aug. 10-12 Navy v. R.A.F. Cricket Match.
Aug. 20–Sept. 2 .... International Aero Exhibition, Copenhagen.
Sept. 10 .... Gordon-Bennett Balloon Race, Denver, U.S.A.
Sept. 25 .... Schneider Trophy Race at Venice.
Oct. 20 .... Aero Golfing Soc. (Cellon Cup), Walton Heath.

EDITORIAL COMMENT.

PROBABLY not all the money in the world would have sufficed to "buy" the demonstration given last Saturday by Flight-Lieutenant Carr when he successfully landed the Hawker "Horsley" at Martlesham Heath aerodrome. But now that the demonstration, at practically an infinitesimal cost, has been made—unpremeditated though it was—it has provided the best possible proof of the qualities of the machine. So much so that it may be said to be of greater value, from some points of view, than if the flight to India had been a complete success. After all, in the first attempt the "Horsley" and its "Condor" engine got as far as the Persian Gulf, with enough fuel left to have reached Karachi. Thus we *know* the machine and engine to be capable of that distance at least. But there must always be those who will maintain that this is all very well, but to do it the machine has to be grossly overloaded, is in fact a freak, is highly dangerous to its crew, and possibly to those below it on the ground, and is, in short, of no use whatever. In case of engine failure the machine must inevitably crash, and except for the most extreme good luck, the crew will probably be killed, and so on and so forth.

An Unpremeditated Safety Demonstration

Carr's second attempt to fly to India was a failure, there is no denying it. But Carr's saving of his machine was one of the greatest successes in the history of British aviation. By landing his machine safely at Martlesham he demonstrated that these long-distance machines, overloaded though they necessarily must be, are not inevitably dangerous. All the "slide-rule merchants" in the world could not have proved that the "Horsley" could be landed with that load on board. Carr did prove it, and by so doing he did more, to our way of thinking, than merely demonstrate his skill as a pilot and the excellent qualities of his machine. He set an example of devotion to duty, of determination to do his best to save his machine, which must for ever remain as a glorious example for the younger generation of the Royal Air Force to live up to.

When parachutes were first introduced in the service there were those who objected to them, on the grounds that the wearing of parachutes would tempt pilots to abandon their "ships," when a man without a parachute would have had to do the best he could with his machine, and might have saved it. If ever two men had inducement to use their parachutes Carr and Mackworth had. There was the machine in trouble. It was problematical how much longer they could keep running at the rate at which oil was being lost. There was the sea, only a few miles away. What could be simpler than to make for the coast, abandon the machine close to the beach, descend safely in their parachutes and swim ashore? The temptation must have been great, and certainly nobody could have blamed them for taking that course. That they did not is an eloquent testimony to the spirit and determination of the R.A.F. The machine was at 2,000 ft. or so when it reached Martlesham. Thus there was ample altitude to make the descent by parachute. Not only did Carr stick to his ship, but Mackworth, who might easily have jumped and in so doing would have done nothing to deprive Carr of any assistance which he could have given, did the same. That, we think, is a fact which should not be overlooked. If Carr deserves the greatest credit for the way he saved the machine, Mackworth is no less entitled to respect for the way he stuck to it. After all, Carr was busy landing the machine, working the controls, fully occupied. Mackworth was unable to do anything to help. His duty it was to sit tight and face the music; and he did it. Both have done well, and both have worthily upheld the best traditions of the R.A.F.

Why?

Rumour is busy just now with reports of two more transatlantic flights in contemplation. According to the daily news sheets, one is to be made on a Dornier "Wal" flying boat, and the other on a Fokker monoplane. In both cases the pilots and engines are said to be British. Now we have nothing whatever against either machine. In fact, we regard them as being very good, each in its own class. But if pilots and engines are to be British, why not go the whole hog and use British machines also? Surely those most directly concerned will not claim that there are no British machines capable of doing the work? If both attempts meet with success, who is to claim the record? In the one case we have a German machine British engined and manned by a British crew. In the other a Dutch machine manned by a British crew and fitted with a British engine. Will the Germans and Dutch claim the records, or are we entitled to claim them, or if not, why not? No one would rejoice more sincerely in the successful accomplishment of such flights by British aviators than FLIGHT, but frankly we cannot see any point at all in these hermaphrodite attempts. Instead of scattering our efforts in this manner, it would be very much better to work together for the good of British aviation in general.

Round the Atlantic

Although establishing no recognised world's records, the flight just completed by the Marquis of Pinedo is in many ways one of the most remarkable in the history of aviation. While recently several land aeroplanes have covered great distances over the sea, Pinedo has covered greater over land in a seaplane. Not only so, but, somewhat unintentionally, after the manner of Carr and Mackworth, he has given a demonstration of the seaworthiness of his machine by making a forced descent on the water, remaining afloat for close on a week, and ultimately being towed into the Azores, sustaining surprisingly little damage during the 300 miles' tow.

In discussing trans-oceanic flights one frequently hears the opinion expressed that, after all is said and done, it matters little what type of machine is used, since a descent on the sea will generally mean disaster sooner or later whatever the type of machine. Thus we have frequently been told that even a large flying boat would very soon come to grief in the huge waves of the Atlantic Ocean. That this is not necessarily so was amply proved by the Marquis of Pinedo. Incidentally, his long tow on the surface seems to have demonstrated that the twin-hull machine *can* be made strong enough to withstand the torsional stresses which the oblique meeting of the hulls with the waves must set up.

That the first Savoia machine should have come to grief at Roosevelt Dam is to be very greatly regretted, and it is essential that one should bear in mind that this accident was in no way to be blamed on the machine itself, the fire being due to a carelessly-thrown match. But for this accident there is no reason to doubt that the rest of the 25,000 miles' flight would have been completed in the original machine.

In every way, the Marquis of Pinedo is to be congratulated on his splendid achievement, and the honour bestowed upon him by His Majesty King George by awarding him the Air Force Cross will be heartily welcomed by British aviation in general, which sees in it a fitting expression of the admiration and esteem with which the gallant Marquis is held in this country.

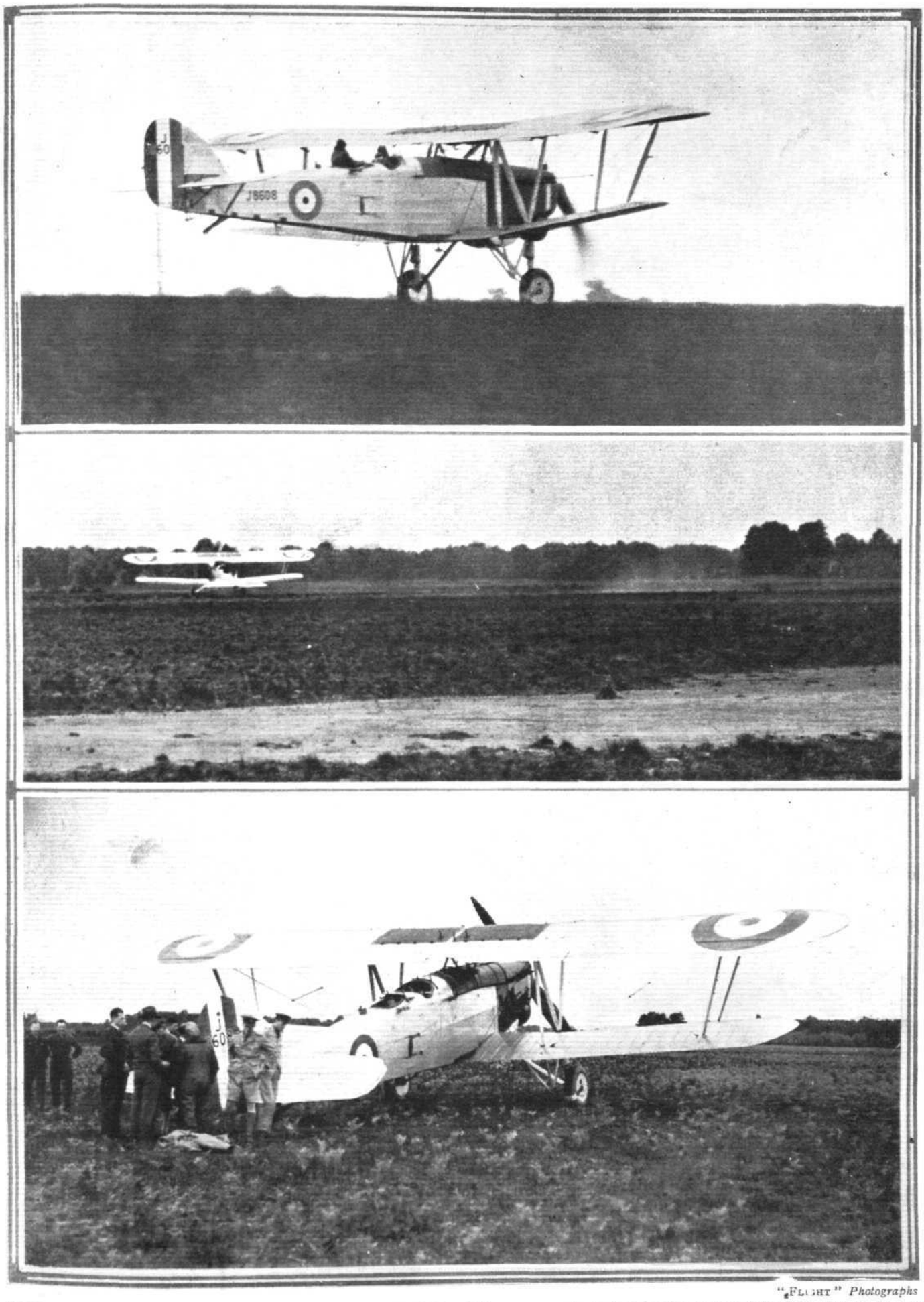
The King's Cup Race

We are extremely glad to learn that the Royal Aero Club has decided not to hold the race for the King's Cup at Bournemouth after all. As we pointed out last week, this is the one race of the year which should above all others be regarded as a *National* event, and which should, in so far as is practically possible, be so planned as to give the greatest number of people an opportunity of seeing the competing machines. If properly handled, the King's Cup race can be made a very powerful weapon in an "air-mindedness" propaganda, but holding the race over a short course in the vicinity of a seaside resort is throwing away an excellent opportunity.

At the moment it has not been definitely decided where the King's Cup race will start and finish, nor what is to be the course, but it seems likely that one of the London aerodromes, or possibly Lympne, will be the starting point, and that the circuit will be either one around England, or several out and in or around London. If practically possible, we should prefer the former, as being more in keeping with the spirit of this race. But it should be remembered that very probably a number of low-powered machines will be entered, and the course is limited by the distance which the slowest machine can cover in a day.

As regards meetings at Bournemouth, we understand that the statement which has appeared, to the effect that all future meetings at Bournemouth have been cancelled by the Royal Aero Club, is incorrect. Only the August Bank Holiday meeting is affected.

FLIGHT
AIRCRAFT ENGINEER AIRSHIPS



"FLIGHT" *Photographs*

THE IMPROMPTU SAFETY DEMONSTRATION : The upper photograph shows the Hawker "Horsley" taking off from Cranwell aerodrome. In the centre is depicted the historic moment when Flight-Lieut. Carr landed the machine without straining a single thing. Note the little puff of dust where the wheels first touched, and also that the landing was a "three-point" one. The lower photograph shows the machine at Martlesham just after landing. It is quite obvious that the machine is intact, even to its Palmer tyres.

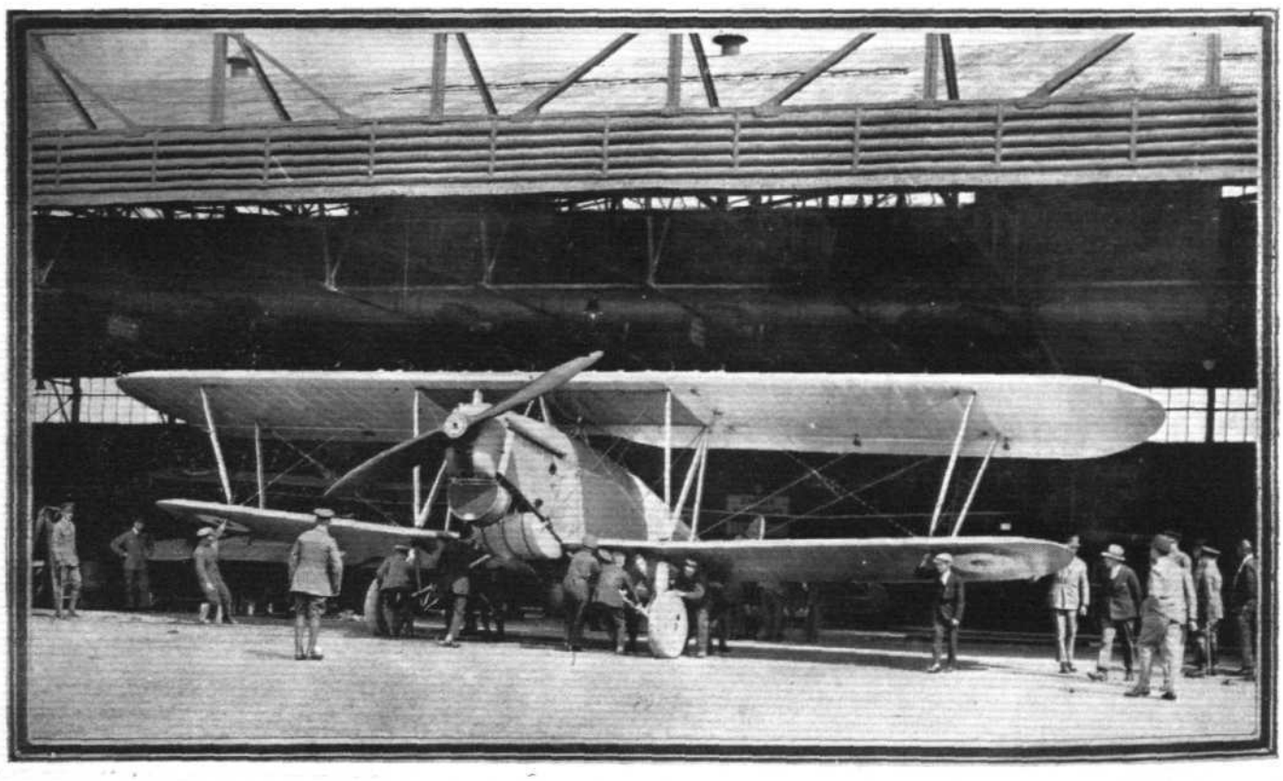
A SUCCESSFUL FAILURE

"Horsley" Landed Safely With Over 1,000 Gallons of Petrol on Board

THERE are two ways of looking at the unsuccessful second attempt of Flight-Lieut. Carr to beat the world's distance record, which ended in a forced landing at Martlesham Heath, Suffolk. One is to regard it purely as a failure—and this view may, unfortunately, be taken pretty generally abroad, where others are anxious to prove the inferiority of British aircraft. The other is to regard it as a splendid success—not in the particular way originally intended, it is true, but in a manner which has left one with much more admiration for the Hawker "Horsley" machine than would have been the case even had the machine succeeded in beating the present record. Personally, we are firm upholders of

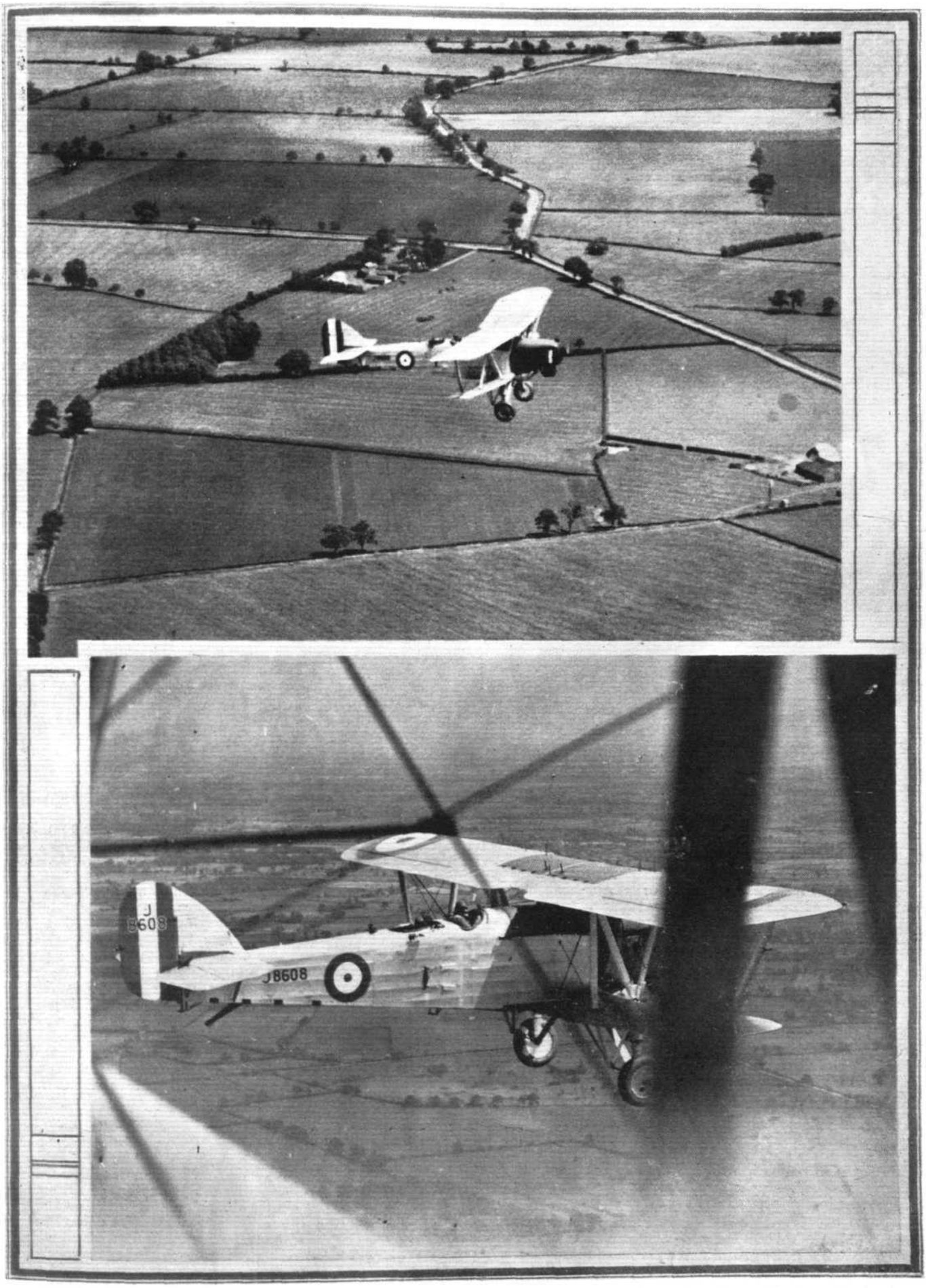
["FLIGHT" *Photograph*

TWO VERY BRAVE MEN: Flight-Lieut. Carr and Flight-Lieut. Mackworth at Cranwell before the start of their flight. By safely landing the "Horsley" at Martlesham they set a splendid example for younger R.A.F. officers to follow.



["FLIGHT" *Photograph*

A HIGHLY SUCCESSFUL FAILURE: The Hawker "Horsley," with Rolls-Royce "Condor" engine, being brought out of its shed at Cranwell before the start last week.



["FLIGHT" *Photographs*

EN ROUTE : Above, the Hawker " Horsley " shortly after leaving Cranwell aerodrome. Below, Flight-Lieut. Carr flies up close to another machine (from which these photographs were taken) in order to signal to Flight-Lieut. Bulman (who was piloting the second machine) that he is having trouble. A few minutes afterwards oil was seen to spurt from the machine, and it was then Carr made his decision to land at Martlesham.

the second view. But let the story of the flight be told in proper chronological order.

Flight-Lieuts. Carr and Mackworth had been waiting at Cranwell aerodrome for nearly a week. Either the winds on the aerodrome were from the wrong direction to make a take-off advisable, or conditions over the route generally were unfavourable. The discovery of a petrol leak on one of the days caused a further wait. At last, on the morning of Saturday, June 18, the reports of the meteorological experts were to the effect that conditions on the route might be expected to be good. At Cranwell the wind at last was kind, blowing strongly from the west, the direction giving the best run for a heavily-loaded machine.

The "Horsley" was brought out of its hangar and wheeled across the aerodrome. Not, however, without first bursting a tyre. It might be argued that a tyre ought to stand up to a short taxying across an aerodrome. So it normally would. But it should be recollected that this particular tyre had been supporting more than 7,000 lbs. for nearly a week while the machine was standing ready in the hangar. Small wonder it got "tired."

Upon being fitted with a new tyre, the "Horsley" was placed face to the strong west wind, the engine was warmed up for a few minutes, and Carr and Mackworth took their seats. The "Condor" was opened full, and with a roar the heavy machine commenced to roll along the ground slowly at first, but gradually gathering speed. For what seemed a tremendous distance, the wheels remained on the ground, and there were those on the aerodrome who began to doubt whether the machine would clear the wall at the end of the aerodrome. It seems likely that Carr deliberately held it down so as to make quite sure. Shortly before reaching the wall the machine lifted and cleared the obstacle with a comfortable margin.

Making a long gradual turn, the machine proceeded south, escorted by two other Hawker "Horsleys," and was soon lost sight of, the more so as it naturally did not climb especially fast. The flight had commenced. It was soon to come to a stop, however. When somewhere in the vicinity of Ipswich, Carr signalled to Flight-Lieut. Bulman, the Hawker chief test pilot, who was flying one of the other "Horsleys," that he was in trouble. Bulman flew close up, and it was seen that some kind of smoke or mist was issuing from the nose of the machine. It soon became evident that the smoke seen pouring out in two streams was oil, and at the rate the engine was losing it there was no doubt that a quick decision was called for. Mackworth was seen to leave his seat and go down inside, to stand next to Carr while they were discussing what should be done. After a short while Mackworth returned to his seat, and Carr turned the "Horsley" towards Martlesham Heath. Was it possible that he really intended to land, or were the two pilots intending to jump in their parachutes.

Shortly it became evident that they had decided to take a chance of trying to land the heavy machine. Bulman alighted first in his "Horsley," while Carr circled round once or twice. Then he pointed the nose of his machine towards the aerodrome, and began to descend. Closer and closer came the great machine. Just as the right instant Carr flattened out. Then, when with a normal machine one would let the machine drop, Carr momentarily opened his throttle once or twice so as to touch ground at as small an angle as possible. A small spurt of sand went up, showing that the wheels had touched. By this time the tail of the machine was well down, the two wheels and the tail skid touching at the same instant. The machine never bounced. The wheels never left the ground once they had touched. The machine rolled along a short distance and came to rest. The impossible had happened. *Carr had made a perfect three-point landing!* Eye-witnesses who see scores of landings every day agree it was the most perfect landing they had ever seen. And with a machine loaded up to about twice its normal weight. Not a thing was strained during the landing.

By their decision and the great skill of Flight-Lieut. Carr these two officers have set a wonderful example for younger R.A.F. pilots to live up to. How easy it would have been, and how very tempting it must have seemed to Carr and Mackworth, to carry on for another four or five miles, fly out over the coast in the neighbourhood of Felixstowe, abandon the machine over the sea where it could have done no damage, and descend safely themselves by parachute. But, no! That would have meant the loss of the machine. They decided to do their best to save the machine. And thanks to Carr's skill they succeeded.

As to the cause of the oil leak, nothing definite is known at the moment. The engine has been returned to the Rolls-Royce works at Derby, and doubtless an official statement will be issued in due course. We shall have to leave it at that for the present.

"PROGRESS OF AIR COMMUNICATIONS"

THE Royal Colonial Institute held a luncheon at the Cannon Street Hotel on June 21, when Air Vice-Marshal Sir Sefton Brancker was the chief guest, and spoke on "The Progress of Air Communications." The chairman was Lord Stanley of Alderley. Sir Sefton first gave a brief *résumé* of air transport developments since 1919, and pointed out the valuable data that had been gained, upon which it had been possible to make estimates and plans. He instanced the Empire route to India, which, at the moment, was being partly held up owing to the hitch with the Persian authorities. When that had been settled the line to Karachi would be established. In the responsibility of the line beyond this place the Indian Government would have a share, and it was hoped that Australia would manage to link up Australia with Singapore. In Africa considerable experiments had been made, starting with the Khartum to Kisumu service, which had been temporarily held up owing to mishap to the machines. It was hoped that by August their machines now under repair would be completed. The Colonies concerned were keenly interested, and Sir Sefton thought the service would be a boon to the Central African Colonies.

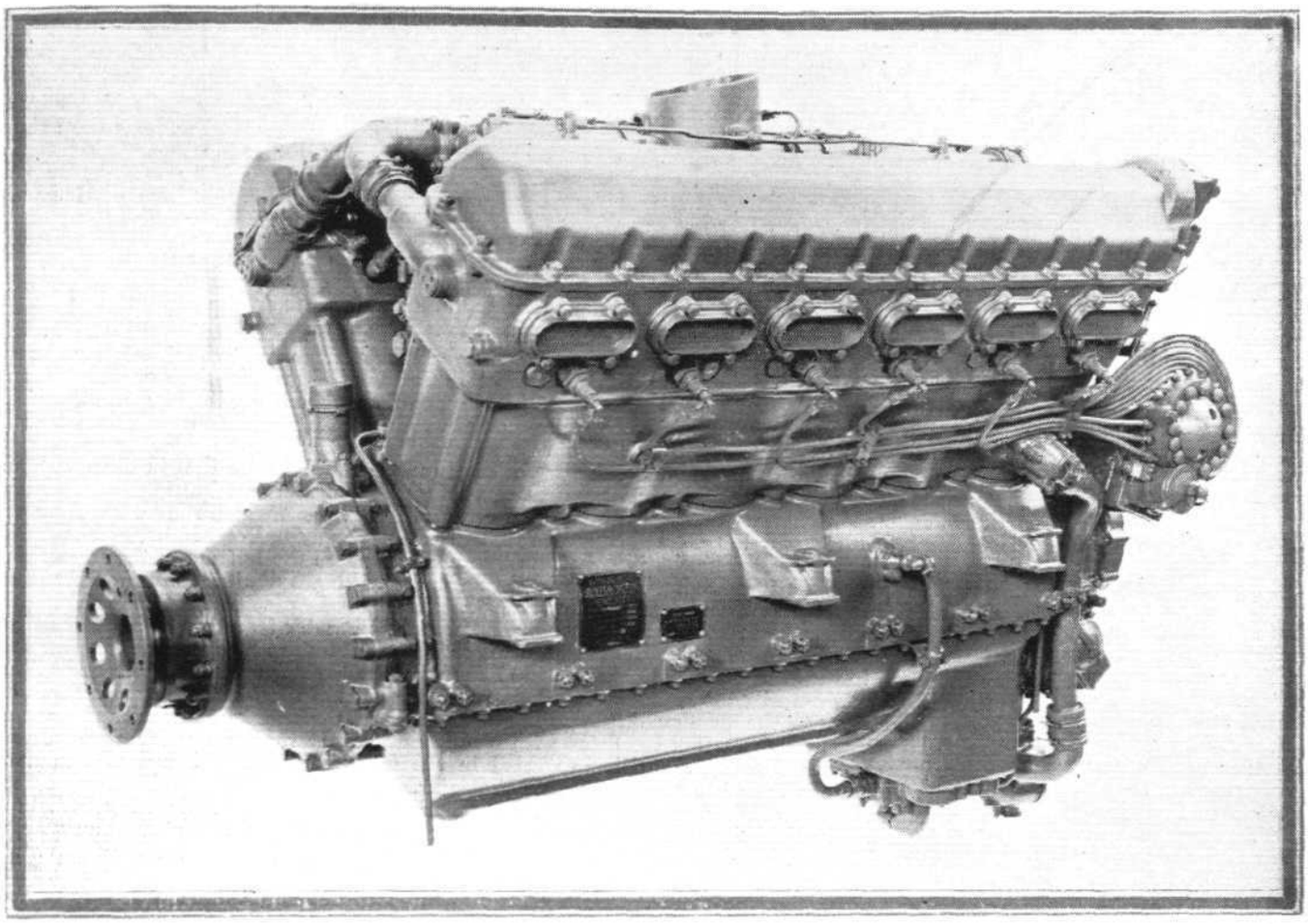
Great Britain was very much behind other nations in the progress of aviation, although our aeroplanes and engines were unsurpassed. There were, for instance, 73 services passing in and out of Berlin every day, which were subsidised by the Government. Air transport today was not paying, but when it did pay it was going to boom. The nation which had the most efficient type of aeroplane would reap a reward. Orders for machines for commercial purposes would be far greater than those for military use, and such fleets would always be available for any emergency. Unless this country made more use of the air than at present our Empire would go to pieces. At the conclusion of his speech Sir Sefton Brancker was thanked by the chairman, Lord Stanley of Alderley.

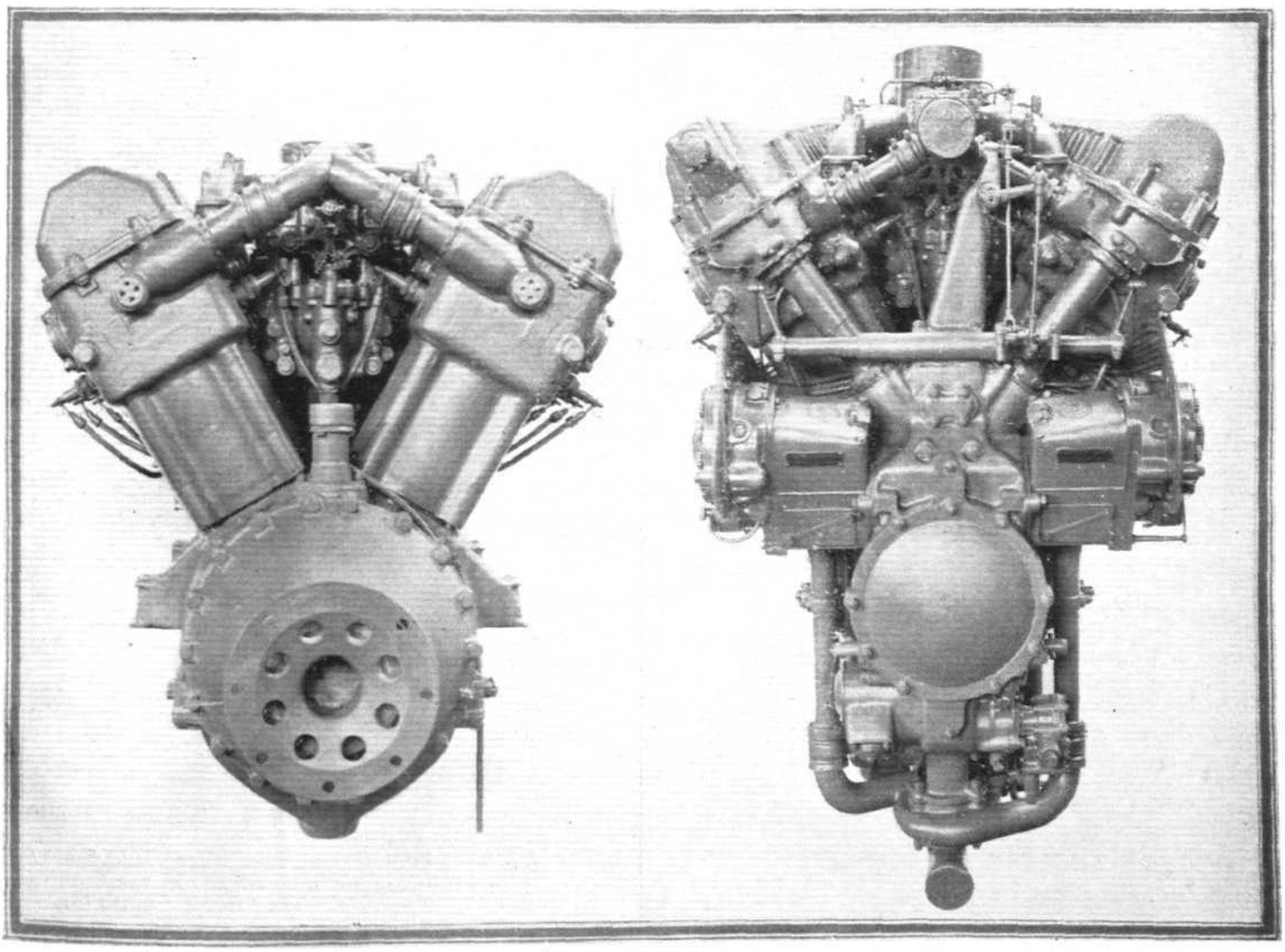
The Prince of Wales Opens Auxiliary Air Force "H.Q."

THE PRINCE OF WALES formally opened the new Headquarters of the 601st Bombing Squadron of the Auxiliary Air Force at Kensington Park Road, on June 21. After inspecting the guard of honour, he was escorted by Sir Samuel Hoare, Air Vice-Marshal Sir Hugh Trenchard, and Lord Edward Grosvenor (in command of the squadron) to the main door of the Headquarters, where Lord Edward handed a key to him, with which he opened the door.

The National Fund for the Promotion of Aeronautics

AT a committee meeting of The National Fund for the Promotion of Aeronautics on June 20, Lord Thomson of Cardington was elected Chairman. It was decided that the objects of the Fund should be the promotion of aeronautical development in the British Empire and in addition to create and administer a fund, the proceeds of which should be devoted to the assistance and stimulation of all existing organisations without prejudice to the independence of the Committee to take such action as it may consider fit at any future date. The fund shall be administered by an executive committee which, in all cases, will consult the trustees before any allocation of funds is made. Any two of the Trustees shall be considered representative of the Trustee body. The executive committee shall have power to amalgamate, co-operate or affiliate with any other body in the British Empire having similar aims and objects to its own.





A NEW ROLLS-ROYCE AERO ENGINE : The F.10 with direct drive. (Also see page 412.)

A NEW ROLLS-ROYCE AERO ENGINE

The F.10 Has Many New Features

THE latest aero engine built by Rolls-Royce, Ltd., is known as the Rolls-Royce F. 10. It is a 12-cylinder Vee-engine of 5-in. bore and 5·5 in. stroke, and will be fitted with a reduction gear later.

This engine has recently successfully completed its official type test of 100 hours at the first attempt, and has been granted an airworthiness certificate.

Aluminium enters very largely into the construction of the R.R. F. 10 engine. Each block of six cylinders is formed from one aluminium casting of a special alloy, with inserted steel cylinder barrels, in direct contact with the cooling water, and is of somewhat unique construction.

The cylinder heads and gas passages are formed integrally with the cylinder castings, and inserted seatings are used for the two inlet and two exhaust valves in each cylinder.

The cylinder blocks are secured to the crank-chamber by long studs passing through the complete depth of the cylinder casting, and they abut on the crank-chamber by means of flanges formed on the cylinder liners.

The pistons are of forged aluminium alloy and the steel connecting rods are of the superimposed type.

The crankshaft is arranged to be coupled at the driving end either to a propeller shaft carried in an extension piece bolted to the crank-chamber, or to the pinion of a spur type reduction gear by means of the patented R.R. drive which relieves the shaft of all bearing loads due to the gear.

The valves are actuated by a single overhead camshaft carried in each cylinder block, operating through the medium of rockers. The scheme has been ingeniously arranged so that each valve has its own independent rocker. The valve mechanism is lubricated by low-pressure oil and is completely enclosed.

The inlet valves are situated towards the inside of the Vee between the cylinder blocks, in which space are carried two double carburettors, each throat feeding three cylinders.

Ignition is effected by two completely independent 12-cylinder magnetos driven by a cross shaft at the wheelcase end of the engine, one magneto dealing with the ignition plugs on the inlet sides of the engine—*e.g.*, in the Vee, and the other magneto operating the ignition plugs near the exhaust valves on the outside of the cylinder blocks.

There are two scavenging pumps and one pressure pump for the lubrication system situated within the oil base.

One scavenger pump evacuates oil from the front end of the engine and delivers into a well at the rear end, where the whole of the drainage oil is then ejected from the engine by the second scavenger pump.

The pressure pump delivers high pressure oil to the crankshaft journals, and connecting rod big and little ends. The overflow from the high pressure system is led through two blow-off valves in series back to the crank-chamber, the cavity between these valves forming a source of low pressure oil for lubricating the valve gear and any other low duty bearings not dealt with by splash lubrication.

This scheme of lubrication provides that in the event of an engine being partly disabled, the first bearings to be starved of oil will be the low duty ones, which run on for some considerable time after the supply has ceased.

A water pump is carried on the bottom of the wheelcase at the rear of the engine having a double volute with a lead to each cylinder block.

The whole of the outlet water from the cylinders is carried serially through the two induction pipe jackets with the exception of the two small water leads provided to maintain circulation at the rear ends of the blocks.

A hand-starting gear of the throw-out worm and nut type, fitted with a safety device, in the form of a set-up clutch, is incorporated in the wheelcase. Provision is also made for fitting a gas starter.

A petrol pump of the gear pattern fitted with a special form of gland is carried on the wheelcase, and also a gun gear, the drive of which can be readily adjusted for timing the guns with the propeller.

The engine is rated to develop 485 h.p., at 2,100 normal revolutions per minute, corresponding to a brake horse-power M.E.P. of 140 lbs. per square inch.

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THE SCARBOROUGH AERIAL PAGEANT

WE give below the programme of the Scarborough Aerial Pageant which is being held under the auspices of the Yorkshire Aeroplane Club at Scarborough on July 9. After the Pageant a dance is being held in the Spa's new Ballroom. At 3 p.m. a rocket will be fired from the Spa to indicate the opening of the programme, which will be as follows :—

Event No. 1 (3 p.m.).—Grand Fly Past of Aircraft.

The machines will leave their parking ground and fly north west of Castle Hill, and around same into the South Bay. Approaching the Spa they will continue flight till level with the Bathing Pool, when they will turn seawards and approach to land opposite Spa.

Event No. 2 (3.30 p.m.).—Joy Riding.

Event No. 3.—Exhibitions of Evolutions.

This will be performed by machines of the Royal Air Force flying in formation, and Private Owners flying abreast of one another. The Exhibit is chiefly intended to show the comparative difference in speed between types.

Event No. 4 (4.15 p.m.).—Parachute Descent.

Event No. 5 (4.40 p.m.).—Stunting in Formation.

This will be performed by machines of the Royal Air Force.

Event No. 6 (5.15 p.m.).—Crazy Flying.

Name of pilot and type of machine will be given later. Whilst this is in progress a Private Owner of a machine will land attired in a bathing costume and proceed to demonstrate the convenience of an aeroplane to take one to the seaside.

Event No. 7 (5.15 p.m.).—An Aerial Combat between two R.A.F. Machines.

Being a demonstration of the antics performed by two combatants in aerial warfare. Each machine seeks to gain a positional advantage over the other for the purpose of ranging his gun on his opponent's vital spot.

Event No. 8 (5.35 p.m.).—Balloon Bursting Competition.

A competition open to all machines other than R.A.F. Entrants will take off in twos and fly to their respective positions. Two different coloured balloons will then be released and competitors will be required to burst two balloons by flying into it. Each competitor will be required to burst two balloons within the period of five minutes from the time of release of the first balloon.

Event No. 9 (6.15 p.m.).—"Pageant of Travel" Relay Race.

Depicting the modes of travel adopted by our ancestors when visiting Scarborough. The Present Mode, and the Coming Mode. The race is divided into six stages.

1st stage, Pedestrians.
Team 1, Phœnician. *Team* 2, Grecian. *Team* 3, Roman.
2nd stage, Horsemen. Dressed in the style of Charles I.
3rd stage, Stage Coaches. Typical of the times.
4th stage, Cyclists. Bone-shakers.
5th stage, Motorists. Modern.
6th stage, Aeroplanes. Ultra-modern.

Address on Aviation by Sir Sefton Brancker from the platform of the Spa.

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The Royal Air Force Memorial Fund

THE usual meeting of the Grants Sub-Committee of the Fund was held at Iddesleigh House, on June 9. Lieut.-Commander H. E. Perrin was in the Chair, and the other Members of the Committee present were :—Mrs. L. M. K. Pratt-Barlow, O.B.E. ; Mr. W. S. Field ; Sqdn.-Ldr. Douglas Iron, O.B.E. The Committee considered in all 14 cases, and made grants to the amount of £168 6*s.* 4*d.* The next meeting takes place to-day (Thursday).

The Rt. Hon. Lord Revelstoke, P.C., G.C.V.O., has been appointed a Trustee of the above Fund in the room of the late Viscount Cowdray, P.C. The other Trustees of the Fund are the Rt. Hon. Lord Hugh Cecil, P.C., M.P., and Marshal of the Royal Air Force, Sir H. M. Trenchard, Bart., G.C.B.

FLIGHT & AIRCRAFT ENGINEER

PINEDO BACK IN ROME

Successful Conclusion to 25,000-Mile Flight

COL. THE MARCHESE DI PINEDO, after an absence of four months during which he flew some 25,000 miles and made two crossings of the Atlantic, has returned safely to Italy, and has thus concluded what must certainly be recorded as—next, perhaps to the Round-the-World flight—the greatest flight made in the history of aviation. Accompanied by Capt. del Prete and Sig. Zacchetti he set out from Sesto Calende in his Savoia S. 55 mono-seaplane on February 8 last, and flying almost daily—with only occasional breaks here and there—journeyed along the west coast of Africa, across the Atlantic to Brazil, then down to Buenos Aires, up through central South America, along the West Indies to New Orleans in the U.S.A., thence to Roosevelt Dam, near the Pacific coast. Here—on April 5—fate, assisted by sky-larking youths destroyed his machine and thus broke the wonderfully steady and dogged progress of his flight.

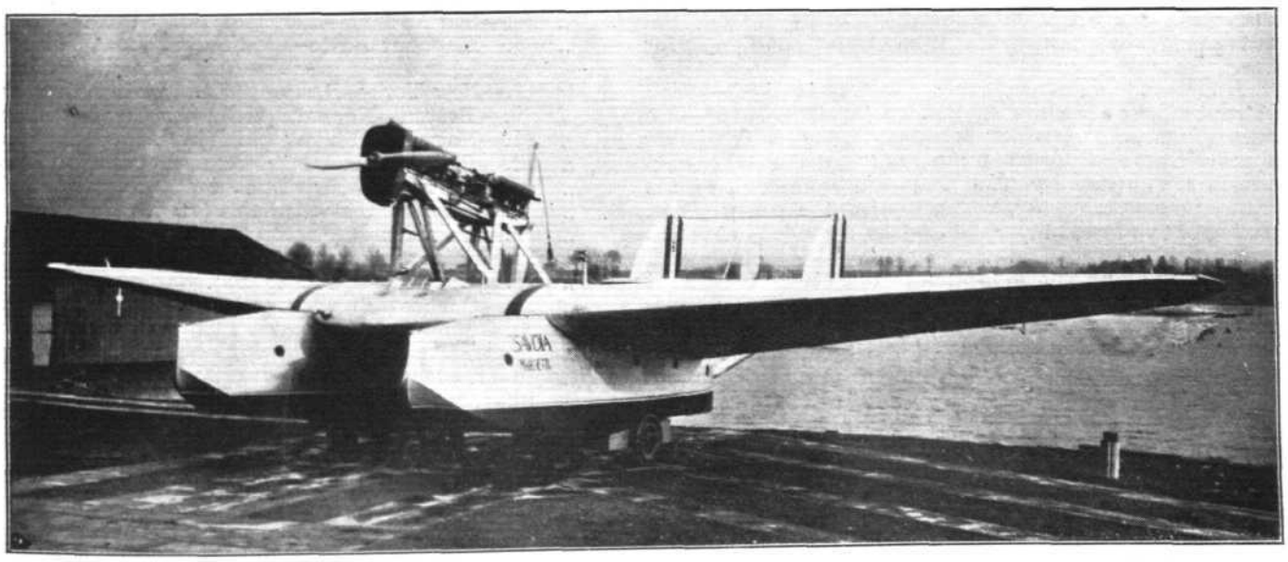
With surprisingly little delay, however, a new machine of the same type was sent out to him from Italy, and, on May 2 he started off once more from New York, and after visiting Boston he worked his way down to New Orleans once more. From here he resumed, so to speak, the thread of the story and proceeded to complete his tour of the U.S. by flying north via Memphis and Chicago. Thence he flew to Canada, making Montreal and Quebec; next came New Brunswick and Newfoundland, and then the second crossing of the Atlantic to the Azores. On this stage he experienced what was perhaps the only big misadventure of the flight; he was, owing to strong head winds and a resulting shortage of petrol, forced to alight on the sea some 300 miles from the Azores, and had to be towed into Horta—an operation which lasted several days and caused slight damage to the seaplane.

However, having repaired the damage to the "Santa Maria II" he set out from Horta on June 10 and after flying to the spot where he made his forced descent continued his journey homewards via St. Michael's Island. He arrived at Lisbon on June 11, and Barcelona on June 13. This brings us to the point where we left him last week.

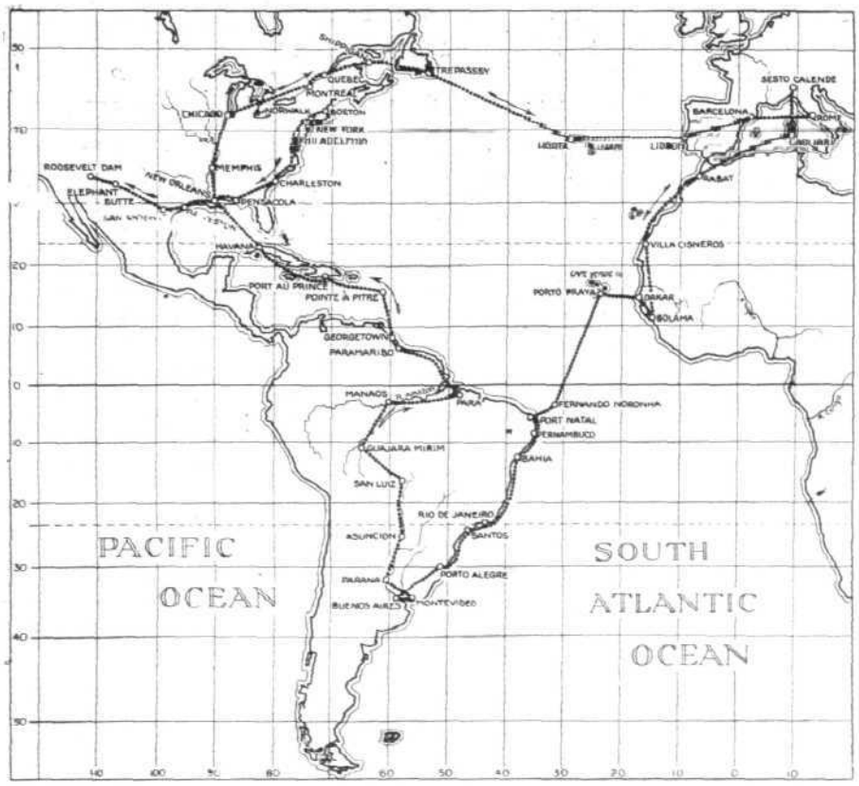
On June 14 the Marchese flew to the Cuatro Vientos aerodrome, Madrid, in a Spanish military aeroplane, and was received there by the Minister of Marine and a number of Italian Fascists. Later he met the Marquis de Estella, Minister of War, and together with the Italian Ambassador attended a luncheon given by the Government and aviation authorities. The following day the Marchese di Pinedo went to the Royal Palace and had luncheon with King Alfonso. In recognition of his flight the Marchese was appointed an honorary colonel in the Spanish Air Force, and was awarded the Spanish Air Medal.

Returning to Barcelona, the Marchese concluded the final stage of his "raid" on June 16 with a six-and-a-half hour flight to Ostia, Rome. He was sighted there by the many thousands waiting to greet him at 5 p.m., escorted by four seaplanes. After making a couple of circuits, amid great enthusiasm, the 'Santa Maria II" alighted gracefully on the water some distance out. Motor launches at once took the machine in tow to a buoy, and the Marchese and his companions were conveyed to the Ostia pier, where they were officially received.

Signor Mussolini received the airmen personally—and in private—in company with Cardinal Vannutelli, Archbishop of Ostia, and other high officials. The first to greet the Marchese



PINEDO'S BIG FLIGHT : The Savoia S.55 mono-seaplane, fitted with two 500 h.p. Isotta-Fraschini engines. Above, Col. The Marchese di Pinedo, the famous Italian pilot who just completed his 25,000-mile tour, involving two Atlantic crossings.



PINEDO'S BIG FLIGHT : Sketch map showing the route taken by the Marchese di Pinedo.

was his mother, after which he was embraced by the Duce. Then followed remarkable scenes as the airmen and reception party motored into Rome, where a second " reception " had been arranged at the Palazzo Chigi.

As might be expected, the whole of Italy was in a state of ecstacy over Pinedo's return, and Rome and other big cities were gaily decorated and illuminated in his honour. Congratulations have been received from all quarters, while the British Ambassador in Rome sent the following letter to Sig. Mussolini :—

" By direction of His Majesty King George I am honoured in asking your Excellency to pray his Majesty the King of Italy to permit the bestowing on Colonel the Marchese de Pinedo of the Air Force Cross. It is with the deepest pleasure that I convey the proposal of giving the greatest flier the highest decoration that can be conferred on a British aviator. British men followed Colonel de Pinedo's latest feat with the utmost interest, and also recall his previous flight when he landed at several British ports where he left an unforgettable record behind him of sportsmanship, frankness, unpretentiousness, skilfulness, and efficiency."

Regarding the technical side of the flight, while it is as yet too soon for any data from the airman himself, the following points are brought out from the information so far to hand.

First, concerning the machine : the Savoia S.55—which has already been described in FLIGHT (April 9, 1925)—is a somewhat unusual type of machine, being a cantilever monoplane with two short-hull " boats," and the tail carried therefrom by outriggers. The boats are connected by the centre section of the wing, which carries the power plant, consisting of two Isotta-Fraschini engines, arranged in tandem and mounted high up on an arrangement of M-struts.

The pilot's cockpit is also located in this centre section, at the leading edge, from which position an excellent view is obtained. The depth of the wing at this point, it may be mentioned, is about 3 ft. Each of the boats have cabins, with windows, of comparatively large proportions (they could, for instance, if desired, accommodate 12 passengers).

The wing extensions are set at a dihedral angle, and taper sharply from root to tip, both as regards chord and thickness. The overall span of the S.55 is 78 ft. 9 ins., the chord, 16 ft. 6 ins.—9 ft. 9 ins. ; and the overall length, 52 ft. 6 ins. The wing area is 1,000·7 sq. ft. As the average load (fuel, oil, equipment, " Smiths' " instruments, etc.) carried was nearly 7,500 lbs., and the weight of the machine empty comes out at approximately 8,100 lbs., the total weight of the " Santa Maria " on many occasions was about 15,600 lbs., or nearly 7 tons !

As regards the flight itself, it was remarkable for the steady progress made practically throughout, and the absence of any really serious trouble. Some difficulty was experienced in taking off from Bolama for the Atlantic hop, but this was overcome by proceeding to Porta Praya (Cap Verdi Is.), and starting from there, thus reducing the length of the " hop," and consequently the total load of fuel required.

The other outstanding features, or incidents, of the flight may be recorded thus. Bad weather prevented Pinedo from alighting at Port Natal (Brazil) at the end of the Atlantic crossing, and he had to fly back a short distance to Fernando Noronha. After leaving Buenos Aires, Pinedo's route lay up through the centre of South America, over very difficult—and in parts unknown—country, with only the various big rivers over portions of the journey to serve as alighting and taking off points. Finally, on numerous occasions, single stages of 1,000 miles or more were accomplished.

Some idea of the day-by-day progress of the flight may be obtained from the following log, in which the *approximate* distances (in miles) between stages are given in brackets :—

February 8.—Sesto Calende—Cagliari (500).
,, 13.—Cagliari—Rabat (1,000).
,, 14–15.—Rabat—Villa Cisneros—Bolama (1,000).
,, 18.—Bolama—Dakar—Porto Praya (700).
,, 20–22.—Porto Praya—Fernando Noronha (1,500).
,, 24.—Fernando Noronha—Pernambuco (450).
,, 25.—Pernambuco—Bahia (460).
,, 27.—Bahia—Rio Janeiro (780).
,, 28.—Rio Janeiro—Santos (200).
March 1.—Santos—Porto Alegre (500).
,, 2.—Porto Alegre—Buenos Aires (650).
,, 14.—Buenos Aires—Montevideo (125).
,, 15.—Montevideo—Parana—Asuncion (850).
,, 16.—Asuncion—San Luiz de Caceres (600).
,, 20.—San Luiz—Guajara—Manaos (1,550).
,, 21.—Manaos—Para.
,, 25.—Para—Georgetown (1,000).
,, 26.—Georgetown—Pointe a Pitre, Guadeloupe (700).
,, 27.—Pitre—Port-au-Prince, Hayti (700).
,, 28.—Hayti—Havana (700).
,, 29.—Havana—New Orleans (900).
April 2.—New Orleans—San Antonio (500).
,, 4.—San Antonio—Elephant Butte (500).
,, 5.—Elephant Butte—Roosevelt Dam. (350).

May 2.—New York—Boston (250).
,, 9.—Boston—Norwalk (200).
,, 11.—Norwalk—Philadelphia (120).
,, 12.—Philadelphia—Charleston—Pensacola (800).
,, 13.—Pensacola—New Orleans (200).
,, 14.—New Orleans—Memphis (450).
,, 15.—Memphis—Chicago (500).
,, 17.—Chicago—Montreal (800).
,, 18.—Montreal—Quebec (150).
,, 19.—Quebec—Shippegan (460).
,, 20.—Shippegan—Trepassy (500).
,, 23–30.—Trepassy—Horta, Azores (1,470).
,, 10–11.—Horta—Lisbon (1,060).
,, 13.—Lisbon—Barcelona (650).
,, 16.—Barcelona—Ostra, Rome (550).
Total distance, approximately 25,825 miles.

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A Northern Alberta Air Survey

THE huge natural park lying within the angle formed by the Slave and Peace Rivers in Northern Alberta, within which the wood buffalo and their near cousins, the plains buffalo, have their habitat, is to be surveyed for the first time, and by air. It embraces an area of 17,000 square miles, and will take a month to complete. Two machines will take up their headquarters at Fort Smith.

The AIRCRAFT ENGINEER

FLIGHT ENGINEERING SECTION

Edited by C. M. POULSEN

June 23, 1927

CONTENTS

EDITORIAL VIEWS

Owing to the holding of the Royal Air Force Display at Hendon next week, it has been necessary to include the June number of THE AIRCRAFT ENGINEER in the present issue of FLIGHT. As a result, the A.E. is somewhat small this week, but we hope to make up for this by increasing the size of the July issue.

As usual, readers will find much to interest them in Mr. North's article, which this week deals with aero engines and gearing. This is a subject which seems to be just beginning to attract the attention that it deserves, and was dealt with to some extent by Mr. C. C. Walker in our issue of January 27, 1927. Mr. Walker showed how power is wasted by using high-speed engines in relatively slow machines. Mr. North goes even further than that and expresses the view that even on racing aircraft the geared propeller would result in a considerable increase in performance.

As Mr. North points out, before one can really form any opinion of the efficiency of an engine, it is necessary to take into consideration propeller efficiency and fuel consumption at the speed and height at which the machine is to operate. His reference to modern aero engines as "light and efficient prime movers for operating dynamometers," is rather apt, although doubtless engine designers will not altogether agree.

Mr. North's statement that, for almost any practicable aeroplane specification, the reduction in fuel weight, fuel tank weight and space, obtainable by the use of a geared engine, will more than compensate for the extra weight of gearing, propeller and engine mounting, should be taken to heart and carefully studied.

The Guggenheim Safe-Aircraft Competition is a subject well to the fore at the moment. The prize is such as to make it well worth while entering for this competition, and in the present issue, "Marco Polo" discusses some of the problems attending the design of a machine with a speed range of from 35 to 110 m.p.h. Doubtless, many aircraft designers will disagree with him, and it is hoped that they will send along their views. We shall be very pleased to publish these in the next issue of THE AIRCRAFT ENGINEER.

AIRCRAFT PERFORMANCE

By J. D. NORTH, F.R.Ae.S.

(*Continued from p.* 38)

In view of the advantages to be obtained by the use of low values of $\frac{\text{R.P.M.}}{(\text{H.P.})^2}$ it would seem surprising that many modern engines have such unfavourable values of K. The reasons for this are complex. In the first instance, scale has an important effect on engines themselves. In geometrically similar engines, stresses in moving parts are the same at the same piston speed: hence, with constant B.M.E.P., from stress considerations, the horse-power from a given volume decreases with increase of scale. For example, in two geometrically similar engines, one twice the scale of the other, the relative capacities would be as 8 to 1, and the speeds as 1 to 2: hence, horse-power would be as 4 to 1 (*i.e.*, horse-power varies as L^2). Cooling conditions similarly permit higher speed with smaller engines, since the cooling surface of a cylinder obviously varies as L^2. Primarily, if engines could be made geometrically similar, the weight per horse-power would *increase* with increase of scale and directly as L, since the weight would increase as L^3 and the horse-power only as L^2. Although conditions of stress, cooling and lubrication* suggest that small engines could be run up to very high speeds, there are other factors which limit the extent to which this can be practically utilised, though induction boosting opens up special possibilities. Similarly, the weight cannot vary as L^3 because it is not practicable to make engines geometrically similar, the minimum scantlings practicable being reached at moderate powers and sizes. At the same time, accessories such as the ignition system, carburettors, &c., vary in weight only comparatively slowly as scale changes.

Here we have conditions governing optimum size closely analogous to those governing optimum size for the aeroplane. Data hardly exist to enable an estimate to be made of most economical size, since engines vary so much in design. The reduction of the number of cylinders in the lower powers, for example, tends to keep revolutions per minute more nearly uniform in large and small engines. It is obvious that, could revolutions per minute vary inversely as L, the K value for direct drive engines would be independent of horse-power: but actually, it is the modern engine of 500 to 1,000 h.p. which stands to gain most from gearing.

There is, of course, with a geared engine, considerable

* *i.e.* P.V.

increase of weight, both in the engine and in the propeller and, to a slight extent, in the engine mounting due to increased torque reaction from the propeller. The stiffening of the crankcase necessary to allow the mounting of gears may be serious, particularly with "Vee" or "Line" engines, and in this class of engine, particularly with the 8-cylinder engine of that type, serious mechanical troubles were experienced with gearing during the war. Eight-cylinder water-cooled engines, developing 200 h.p. at 2,000 r.p.m., were used successfully with direct-drive where the geared engine had given great trouble. These troubles undoubtedly gave gearing a bad name, although other 12-cylinder engines have been very successfully geared, while the fact that the efficiencies obtainable with 200 h.p. at 2,000 r.p.m. are only obtainable with 800 h.p. at 1,000 r.p.m. has perhaps been lost sight of. In more recent times, the success of the United States machines in the Schneider Trophy races using direct-drive engines of high power, with solid metal propellers, gave fresh support to the direct-drive school. The idea that with solid metal propellers satisfactory efficiencies could be obtained gained ground, and was reinforced by the suggestion that the large diameter propellers required with a geared engine would be impracticable on high-speed aeroplanes, either military or for racing purposes. It is true that at top speed, in the case of very high performance aeroplanes, propeller losses attributable to a high K value are principally due to tip speed effects and slipstream drag, and that in the racing machine, a fine run body and surface radiators, as well as the small diameter propeller rendered possible by very high speed, may reduce these losses to a minimum; but the writer has for long been of the opinion that even in racing machines gearing would offer advantages in performance. There can be little doubt that in fighting aircraft, the advantage to be gained on speed and climb would be notable, while on medium or low performance aeroplanes the gain is really very large indeed. Some further leaning towards the ungeared engine perhaps also comes from the use of what may be described as "catalogue figures" in reference to engines: as, for example, the common method of expressing the unit weight of engines as so many pounds per horse-power, this being obtained by dividing the brake horse-power measured on the test bench by the net weight of the engine. Competition for a low figure has on occasion reduced weight figures to an absurdity, as, for example, the exclusion of the propeller nave, or even the magnetos, from the engine weight. Similarly, consumption figures are taken from bench tests at ground level temperature and pressure conditions, which are usually markedly different from those in which the aeroplane has to operate.

The aeroplane designer is, of course, concerned with the gross weight of the installation, *including fuel and fuel containers and distribution system* and its relation to the *net* thrust horse-power at his desired operational heights and speeds. What is meant by net thrust horse-power may be understood from an examination of Fig. 27. It is, of course, impossible to generalise, but the particular example chosen will indicate the order of magnitude of the increase in net thrust horse-power obtainable with a geared engine. The cases chosen are imaginary but approximate to modern radial engines. Two engines are chosen, each developing 480 h.p. at ground level at 2,000 r.p.m.; in one the airscrew rotates at crankshaft speed, in the other at half crankshaft speed. The operational height chosen is 18,000 ft. standard altitude, at which height each engine is considered to develop 238 h.p. at 2,000 r.p.m. The airscrew thrust horse-power depends on the propeller efficiency, the torque curve for the airscrew and the torque curve for the engine. In the case of the fast running propeller, the efficiency has been appreciably reduced by the losses due to the high tip speed. The losses due to the engine drag and the effect of the slipstream thereon are based on a free air drag of 80 lbs. at 100 ft. per second *indicated air speed*. The values of A and B in the equation $\frac{R}{R_c} = A + B.T_c$ are roughly 0·8 and 2·5 respectively. It must be clearly understood that the abscissæ are *true* air speeds: the indicated air speeds at the height of 18,000 ft., which are associated with drag, are much lower: *e.g.*, 120 true is roughly equivalent to 90 indicated.

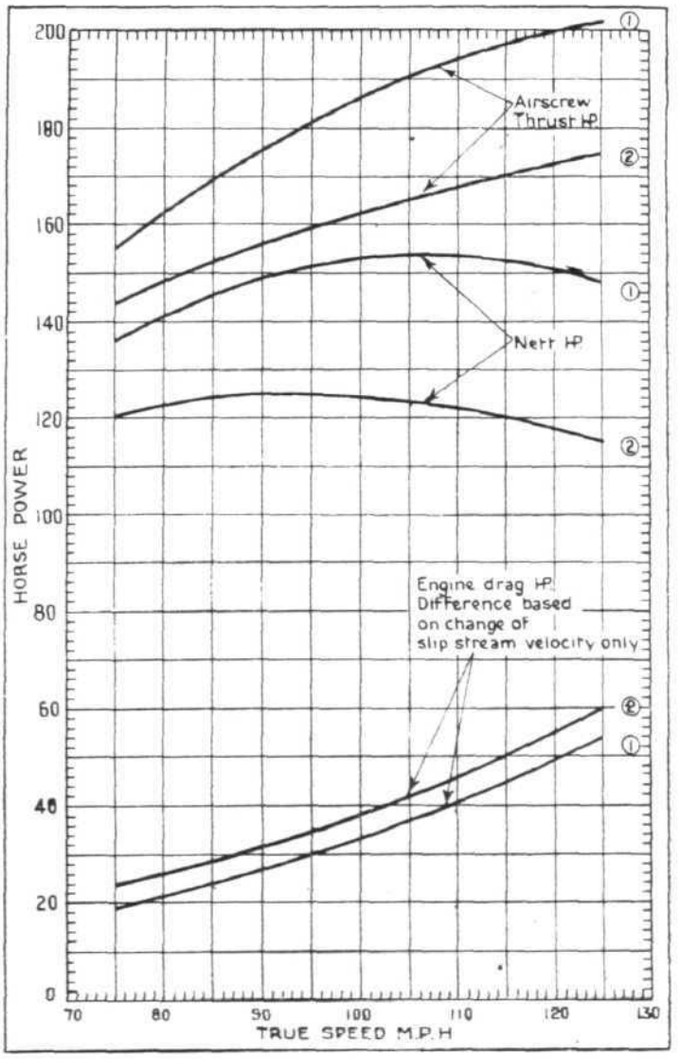


Fig. 27: Horse Power at 18,000 ft. with a radial engine developing 480 h.p. at 2,000 r.p.m. at ground level = 238 h.p. at 18,000 ft. standard. Curves 1 refer to geared engine (gear ratio 0·5) with 11 ft. 6 in. diameter airscrew. Curves 2 refer to ungeared engine with 9 ft. 0 in. diameter airscrew. Normal r.p.m. occur at 120 m.p.h. in each case.

The curves of the net thrust horse-power, which are obtained by substracting the ordinates of the engine horse-power curves from the ordinates of the airscrew thrust horse-power curves, show a very large difference between the geared and ungeared engines. For instance, at 120 m.p.h. the geared engine is giving 25 per cent. more net thrust horse-power than the direct drive one. The fact that the large difference occurs at the high speed end of the scale and that at the low speed end the difference is very much smaller is due principally to the torque characteristics of the particular propeller used in constructing the curves and should not be considered to have any general significance.

No allowance has been made for gear losses, which amount to about 2 per cent. and would in consequence tend to diminish the advantage to the geared engine slightly. On the other hand, in calculating the drag of the engine no allowance has been made for the effect of the variation of the propeller: body diameter ratio which, as was shown in the last issue of THE AIRCRAFT ENGINEER, may lead to appreciable variation in the values of A and B in the equation for $\frac{R'}{R_c}$.

So far as the fuel consumption is concerned it is not possible to make direct use of the net thrust horse-power curves for comparison since, as has already been pointed out, the difference in the torque characteristics of the propellers cause the two engines to run at different angular velocities with different speeds of flight. However, at 120 miles per hour both engines will be developing 238 h.p. at 2,000 engine

revolutions per minute and so will be consuming the same amount of fuel. Hence, at this speed the geared engine has a consumption figure per pound per net thrust horse-power hour 25 per cent. better than the direct drive engine. This reduction in fuel is reflected not only in a diminution of weight and storage space for the fuel itself, but also in reduction of weight of fuel containers. This reduction for almost any practicable aeroplane specifications will *more than compensate for the extra weight of gearing, propeller and engine mounting.*

The case chosen as an example may be considered to be a specially favourable one to the geared engine. With a water-cooled engine the figure for engine drag (which, of course, must include radiator) would be lower and, hence, the advantages would not be so apparent. But even if the engine drag-horse-power curve be halved there still remains a big balance in favour of the geared engine. It must be remembered that at altitude and under practical service conditions, consumption per brake horse-power considerably exceeds the best figures taken on the test bench at ground temperature and pressure and which are usually quoted, and this fact makes the influence of the net thrust horse-power on the fuel weight even more important.

It will be clear that to compare one engine with another the operational heights and speeds as well as range and duration required must be known. The influence of the engine on the drag of the aeroplane (*i.e.*, its drag *in situ*) must be available as well as consumption figures under *representative operational conditions.* When all this is known, engines may be compared on a basis of gross weight and net thrust horse-power. When this comparison is made it is easy to see why improvement in aeroplane performance is not what might reasonably be expected from a study of engine "catalogue figures" for the last fifteen years. Wonderful strides have been made in engine design, particularly in light and efficient prime movers for operating dynamometers, but greater real advances can be made by concentrating on operational conditions more closely. Needless to say, this is difficult. The accurate testing of engines under representative pressure and temperature conditions is not easy to obtain in the air or in the "high altitude" chamber, but these difficulties will, without doubt, be overcome if there is sufficiently instant demand for solution of the problems involved.

(To be continued.)

THE GUGGENHEIM COMPETITION

Some Speculations by "Marco Polo"

IN his Editorial Comment of June 16, 1927, the Editor of FLIGHT rather indicated that he thought a machine of the Cierva "Autogyro" type might prove the solution of the many problems facing the designer of an aeroplane intended for the forthcoming "Safe-Aircraft" competition, donated and organised by the Daniel Guggenheim Fund of America. At the same time, he admitted that there might be some doubt as to the ability of the "Autogyro" to fulfil some of the requirements, even granted that it could cover the necessary speed range. (Extreme speed range was a prominent feature of the early "Autogyro," but it occurred rather low down the scale, *i.e.*, had a *very* low minimum speed, and not a very high top speed.) The writer cannot find himself in agreement with the Editor of FLIGHT on this subject, and it is thought that the following notes, brief and sketchy though they admittedly are, and not, perhaps, really worthy of publication in THE AIRCRAFT ENGINEER, may serve to indicate that fixed-wing aircraft may have quite a chance of complying with the Guggenheim requirements. At the same time, perhaps these speculations may meet with disagreement from aircraft designers, and thus give rise to a discussion that could scarcely fail to be interesting and instructive to those not so intimately familiar with aircraft design.

Qualifying Requirements

Before any aircraft is admitted to take part in the actual tests of stability, controllability, etc., it is required to demonstrate that it can fly level at a maximum speed of not less than 110 m.p.h. and not more than 35 m.p.h. This represents a speed range of rather more than 300 per cent. on the low speed, and being low in the scale, will tax the skill of the designer. It would probably be easier to design a machine to have a speed range of from 50 m.p.h. to 160 m.p.h. than one with the range demanded in the competition.

The next point to note appears to be that the "useful load" (*i.e.*, pilot, observer, and fuel and oil for three hours at full throttle) must be not less than 5 lb. per horse-power. If these "items" (one apologises to the pilot and, especially, to the observer who has to be in the machine during the various manœuvrability and controllability tests, as "items") do not reach the equivalent of 5 lb./h.p., ballast must be carried to make up for the balance. It appears likely that this regulation will have the effect of causing designers to choose machines of relatively low power. This is not so much on account of the extra weight to be carried as because of a little stipulation, not at all prominently stated, but of very considerable importance, to the effect that *for every 10 lb. of useful load over and above these items 1 cubic foot of cabin or cargo space must be provided.*

At first sight this stipulation looks innocent enough. If, however, one looks into the matter to see what it really amounts to, it is found that the space very quickly mounts up, and becomes of importance from the fuselage drag-point of view. For instance, let it be supposed that an engine of 200 h.p. is contemplated. This is really quite a small engine as aircraft engines go nowadays. Let it further be assumed that the specific fuel and petrol consumption will be 0·6 lb./h.p./hr., a fair figure for an average engine averagely tuned. Then the fuel and oil consumed in one hour will be $200 \times 0{\cdot}6 = 120$ lb., and for three hours 360 lb. Pilot and observer may be assumed to weigh 160 lb. each, another 320 lb., giving a total "useful load," as defined in the regulations, of 680 lbs. According to the regulations, the machine should carry 1,000 lb. useful load, so that there remains a balance of 320 lb. to be carried as ballast. This will require 32 cub. ft. of space, or a "cabin" or cargo hold measuring, for example, 2 ft. by 3 ft. by 5 ft. 4 ins. Not a very large volume, certainly, but by no means negligible when it is recalled that the engine is of 200 h.p. only.

For a larger machine, using an engine of 450 h.p., for instance, assuming the same specific consumption, the fuel and oil for 3 hours would amount to 810 lb.; pilot and observer again to 320 lb., making a total of 1,130 lb., leaving 1,120 lb. for ballast and 112 cub. ft. for cargo space, which might have the following proportions: 4 ft. × 6 ft. × 4 ft. 8 in. Thus, the larger machine is, if anything, less unfavourably placed than the medium power one. On the other hand, owing to the fundamental fact that, for geometrically similar machines, the weight increases as the cube, but the area only as the square, of a linear dimension, there is, presumably, good reason to keep machines as small as possible (quite apart from the question of cost), so that it is to be expected that the majority of designers will "plump for" the smallest machine that will comply with the requirements. With the same specific consumption as before, this is found to be a machine having an engine of 100 h.p. The weights then become: pilot and observer 320 lb.; fuel and oil for 3 hours, 180 lb.; total "useful load" 500 lb. = 5 lb./h.p.

This figure is, of course, somewhat elastic, and by choosing an engine of slightly different power, or having a slightly different consumption, or a combination of both, there is a considerable margin before the cargo space question becomes really important. With an engine of lower power than 100 h.p., or with lower consumption, one would be throwing away a certain amount of weight by carrying more than 5 lb./h.p. "useful load."

In order to see what one is up against, let us examine briefly what a 100 h.p. machine would represent in order to pass the qualifying requirements. Let is be supposed that for a power of 100 b.h.p. a machine could be built for a total loaded weight of 1,600 lb. The de Havilland "Moth" weighs in the neighbourhood of 1,300 lb., so that with the extra power of the 100 h.p. machine, and its fuel, this figure would appear to be a fairly reasonable one. At the maximum speed of 110 m.p.h. one might probably count on a propeller

efficiency of about 70 per cent., which would give a thrust at 110 m.p.h. of $\frac{375 \times 100 \times \cdot 70}{110} = 239$ lb. For the total loaded weight assumed, this would represent a value of L/D of approximately 6·7, which is rather high in view of the light wing loading necessitated by the low minimum speed of 35 m.p.h. In fact, a rough estimate of the wing drag of a good modern aerofoil section, of the area necessary, indicates that the thrust horse-power required to overcome wing drag only, at the top speed, would be in the neighbourhood of 40 h.p., or, again, assuming 70 per cent. propeller efficiency, approximately 57 b.h.p. This would leave but 43 b.h.p. for overcoming the drag of fuselage, undercarriage, tail, and wing bracing. In other words, at the angle corresponding to 110 m.p.h., it will be no easy matter to attain an L/D of 6·7 or so. The majority of "normal" aeroplanes with the figures for which the writer is acquainted appear to have an L/D, at a corresponding attitude, of somewhere in the neighbourhood of 4. And that figure refers to machines much more heavily loaded than will be those entered for the Guggenheim competition.

The problem comes to this, then, that what is wanted is not so much a machine having a high value of maximum L/D as one having a high L/D at small angles of incidence.

In this connection it is of interest to examine the very efficient design of the Martin "PM3," published in THE AIRCRAFT ENGINEER of April 28, 1927. This machine, it will be recollected had a very high maximum L/D (about 18 full scale, 17 model), but as has been shown, this in itself avails us little.

The polar curves of the Martin P.M.3, obtained at the Göttingen laboratory, are very nearly vertical over a considerable range of lift coefficients at the lower end of the scale. In other words, the drag remains reasonably constant over a fair range at the high-speed end, while the maximum L/D occurs at a fairly low lift coefficient. Of course, due to the fact that the speeds corresponding to these low lift coefficients are fairly high, the *power required*, as distinct from the drag, goes up fairly rapidly, but on examination the curves seem promising.

To be on the safe side, and in view of the fact that two engines have to be used in the Martin P.M.3, one should probably allow slightly more for total loaded weight than was done in the case of the 100 h.p. machine previously examined. In order to get at anyrate a rough idea of how such a machine might be expected to work out, let us assume that the total loaded weight of a machine of the Martin P.M.3 type is 1,800 lb. The maximum lift coefficient, according to the Göttingen curves, is about 100. In British "absolute" units, this corresponds to a lift coefficient of 0·5, and as the minimum speed is to be not more than 35 m.p.h., the wing loading becomes 3·12 lb./sq. ft. This is, unfortunately, very light, but in spite of any increase in k_L max. that may be expected owing to scale effect, it will probably not be safe to assume a higher loading. Accepting this figure, therefore, a total wing area of 577 sq. ft. is obtained. The original Martin P.M.3 model as tested as Göttingen had an aspect ratio of 6. With our wing area this would correspond to a span of approximately 59 ft. and a chord of 9 ft. 10 in. By no means a small machine.

With a wing loading of 3·12 lb./sq. ft., the lift coefficient corresponding to 110 m.p.h. will be 0·05 in British "absolute" units. From the Göttingen curves on p. 30 of THE AIRCRAFT ENGINEER of April 28, 1927, it is found that at a C_a of 10, the C_d of the Martin P.M.3 model is approximately 2·2, or 0·011 "absolute." In other words, the model L/D is 4·545. This is a good deal less than was found to be required.

For our 1,800 lb. machine, the drag would be 396 lb. at 110 m.p.h., corresponding to a horse-power required of 116·2 h.p. Again, assuming a propeller efficiency of 70 per cent., the actual power required would be 166 b.h.p. Thus even the efficient Martin monoplane would not, apparently, cover the required speed range with an engine of 100 h.p., or rather with two engines of 50 h.p. each. If, however, it be possible to build the machine for the weight assumed, 1,800 lb., when fitted with two engines such as the "Cirrus Mark II," the top speed seems to be just attainable. Assuming 170 h.p. maximum for the two engines, and the same consumption as before, fuel and oil for three hours would weigh 306 lb. which with weight of pilot and observer, would make a total of 626 lb., leaving 224 lb. to be carried as ballast. This ballast would require 22·4 cu. ft. of space, or 11·2 cu. ft. in each fuselage, which would not be difficult to arrange for. The doubtful point then narrows down to the weight figure of 1,800 lb. Any serious increase on that would reduce the margin of possibility of attaining 110 m.p.h.

How a machine like the Martin P.M.3 would fare in the steep glide, manœuvrability and controllability tests the writer does not profess to know. Presumably by fitting lateral controls of the Handley Page slot-aileron type, the lateral control might be made very powerful for stalled glides, but of that probably Mr. Handley Page could tell us something in a forthcoming issue of THE AIRCRAFT ENGINEER.

A type of machine which appears to offer distinct possibilities, for which, in fact, the Guggenheim competition seems to have been specially designed, is the Hill "Pterodactyl" tailless monoplane. In his paper read before the Royal Aeronautical Society, and published in the Society's Journal of September, 1926, Capt. Hill gave some curves and tables relating to the characteristics of his machine. There appears to be a slight discrepancy between the two. Thus on the curve, Fig. 5, on p. 526 of the Journal, the maximum L/D is shown to be just under 11. In the table on p. 540 a maximum L/D of 14·21 is given. According to the curve, the maximum L/D occurs at a lift coefficient of 0·4, whereas according to the table it corresponds to a k_L of 0·259. Possibly the explanation is that the curve refers to the complete model, while the table represents the figures for wing only. If that is the case, the L/D of the model at the lift coefficient corresponding to 110 m.p.h. and k_L max. of 0·5 is only about 2·5 to 3, which is a good deal lower than was found to be required. It should be remembered, however, that the original model had a modified airscrew 4 wing section, with considerable "wash-out" of the wing tips. Presumably, by using a more modern wing section with small travel of the c.p., and by making use of every other refinement which modern knowledge may suggest, Capt. Hill could improve considerably on the efficiency of his first machine. If, for instance, he could bring the full-size efficiency generally up to that shown in the table, and by designing specially for high L/D at top speed, it would seem at least not without the bounds of possibility to produce a machine of 100 to 150 h.p. or so that would cover the required speed range. The tailless machine, with its small *nacelle*, appears to offer excellent opportunities for reducing body drag.

The absence of marked stalling point, the use of the wing tip controllers, the wing rudders used as air brakes for varying the gliding angle, and so forth, are all features which tally exactly with what those responsible for drawing up the regulations for the Guggenheim competition have obviously been aiming at. How the machine would recover from "normal" and "abnormal" attitudes one does not know, but all the controls appear to be so ample that presumably the desired stability could be attained readily enough.

The writer commenced these notes by expressing disagreement with the view that the "Autogyro" seemed the only solution. He will conclude by expressing the opinion that the tailless machine appears to offer the most promising line of attack on the problem. It is to be expected that a great many aircraft designers will not share this view, but if they will come forward and show how a better and more promising design can be produced, their arguments will doubtless be followed with interest by readers of THE AIRCRAFT ENGINEER.

(The Editor would point out that "Marco Polo," who desires to remain anonymous for reasons best known to himself, has no connection with, nor interest, other than a scientific, in the "Pterodactyl." We know him to be perfectly unbiased, and that in writing these notes he has been actuated solely by the desire to examine how the problems of fulfilling the Guggenheim conditions may possibly be met. We shall be pleased to have the views of other aircraft designers on this subject, and shall be glad to publish these in the next issue of THE AIRCRAFT ENGINEER.)

FLIGHT AND AIRCRAFT ENGINEER AIRSHIPS

CIVIL AVIATION ABROAD IN 1926

A PERUSAL of Part II of the Official Report on the Progress of Civil Aviation, issued recently—a review of Part I of which, dealing with Civil Aviation within the British Empire, appeared in our issue of April 28, indicates that there was considerable activity in civil aviation in foreign countries. This activity, from current items of news to hand, appears to be continuing to an even greater extent this present year. It may, therefore, be of interest if we give just a brief outline of the movements in this connection during 1926 in the various foreign countries, as set out in the Report referred to.

Germany.—It was in France and Germany that the greatest activity prevailed during 1926. As far as actual miles flown and passengers carried, Germany headed the list, even though the figures given only covered the period April 1—December 31. The number of miles flown was 3,816,144, the number of passengers (complete journeys), 56,268; baggage and freight, 632·5 tons, and mails and newspapers, 297 tons. The mileage flown shows an increase of about 741,000 over the published figure for the whole of 1925, while the increase of passengers carried is stated to be 50·3 per cent.

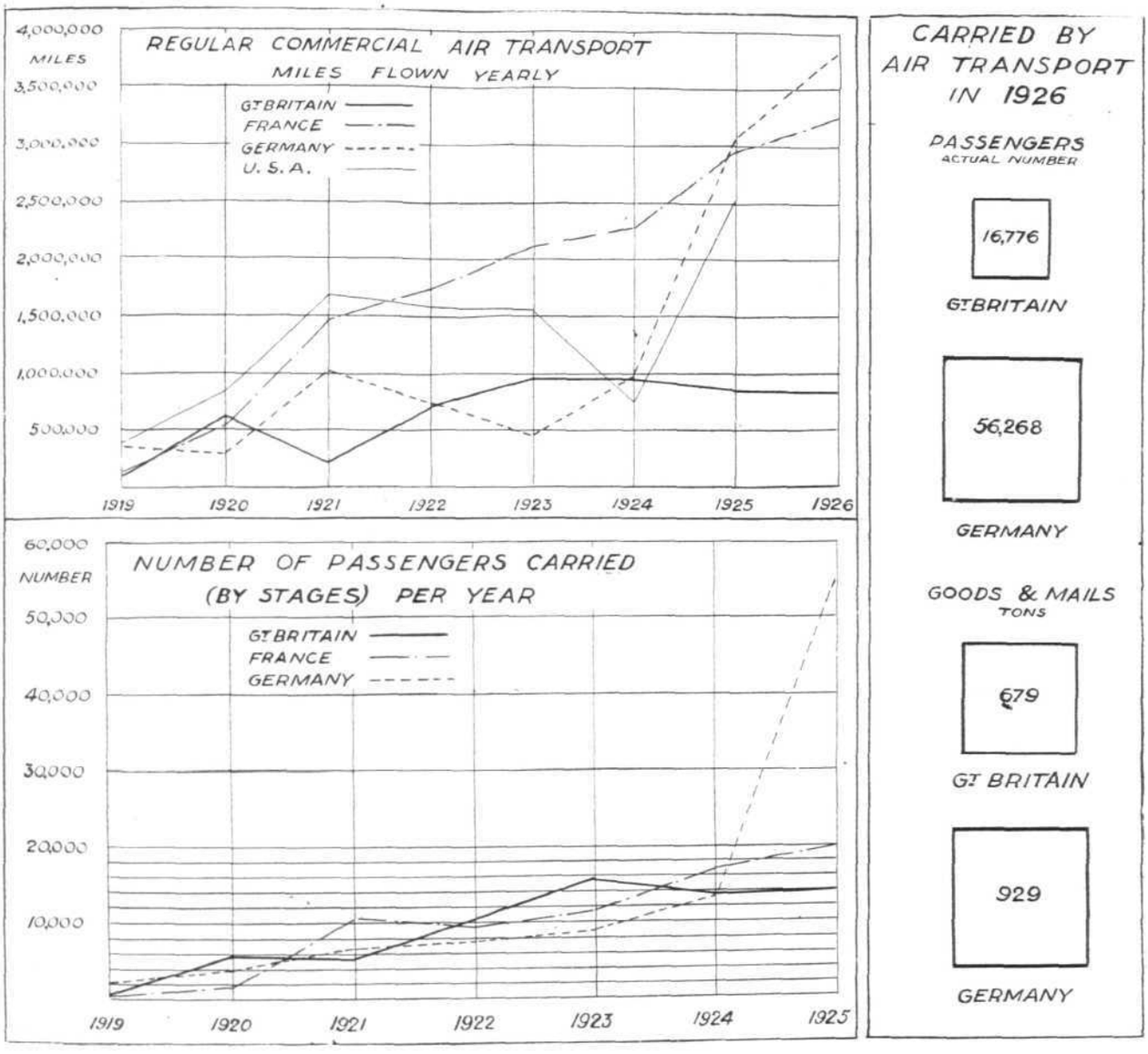
The total length of the German airway system in the summer of 1926 was 12,680 miles, as compared with 10,920 miles in 1925.

It will be remembered that the new German air traffic combine, Luft Hansa, came into operation on April 1, and during the summer the Luft Hansa, in conjunction with the various local companies and with certain foreign companies, operated some 50 services. These, with the exception of certain simplifications and additions, were substantially the same as those operated by the old companies during 1925, but a few changes were made in the routes radiating abroad.

As a result of the Franco-German Air Convention, a through service between Berlin and Paris was inaugurated, while night flying on the Berlin-Konigsberg section of the Berlin-Moscow route was introduced and successfully maintained. During October the most ambitious winter programme yet attempted by Germany, consisting of 30 of the more important lines, was brought into operation.

As regards future schemes, during 1926 Luft Hansa carried out a successful survey of the proposed Berlin-Peking route, while a certain amount of preliminary work was done in connection with a seaplane service across the North Sea to England. Enquiries have also been made in Iceland with a view to investigating the possibilities of a service between Germany and North America, via Scotland and Iceland.

France.—Chiefly on the grounds of economy, the administration of civil aviation in France has been completely reorganised—the Under-Secretariat of State for Aeronautics and Air Transport having been suppressed, and its place taken by a Directorate-General under the authority of the



SOME COMMERCIAL AVIATION STATISTICS: These graphs, more or less self explanatory, have been produced by Col. the Master of Sempill, Chairman of the Royal Aeronautical Society. The progress made by Germany during recent years is most clearly brought out. It should be pointed out, however, that in showing number of passengers carried "by stages," the long-distance routes are liable to score a somewhat unfair advantage, since, presumably, a passenger carried over a route on which three intermediate landings are made will be "counted" four times. A more just comparison would be obtained by comparing the traffic on a passenger-miles basis.

Minister of Commerce and Industry. This Directorate comprises three sections—aircraft construction, airways and communications, and personnel and accounts. The three outside establishments of the Under-Secretariat, the Service de la Navigation Aérienne, the Service des Fabrications de l'Aeronautique, and the Service Tecnique d l'Aeronautique have been reduced to two—the former and latter.

While the total vote for Civil Aviation for 1926 (142,679,190 fr.) was reduced by about 10,000,000 fr., as compared with 1925, the subsidy vote was larger, 60,500,000 fr. (as against 51,610,000 fr.) being allotted to air transport companies.

The total mileage flown in 1926 was 3,243,900, and the number of passengers carried 18,861 (by stages), or 4,096,050 passenger-miles. Goods and mails carried came out at 1,636·5 tons (by stages), or 340,460 ton-miles.

As regards services operated, as the result of an agreement signed with Germany in May, a daily service was opened between Paris and Berlin, via Cologne and Essen, which was run jointly by the French Compagnie Générale de Transport Aériens and the German Lufthansa. It was made possible, also, to resume the C.I.D.N.A. service between Paris, Warsaw and Constantinople, via Strasburg and Prague, with intermediary landings in Germany at Nuremburg and Breslau.

In addition to the Paris-Berlin service, the following service was operated by the same company:—Paris Brussels-Amsterdam, connecting with the Swedish Aero-Transport service to Hamburg, Copenhagen and Malmo, while the first named service also connected at Cologne with the Copenhagen and Malmo service operated by the Danish company, Dit Danske Luftfartselskab.

For the first time the Latecoere company in 1926 carried passengers on its Casablanca-Dakar, and Alicante-Oren routes, and also proceeded with the development of its proposed service to South America.

The Cie. Air Union, in addition to its usual Paris-London service, opened on June 1 a service from London to Marseilles via Paris and Lyons, with a branch line from Lyons to Geneva. This company also took over the Antibes-Ajaccio route, hitherto operated by Cie. Aeronavale, on the amalgamation of the two companies. Another French company, Cie. Aerienne France-Algeria, operated an experimental seaplane service (500 miles) between Marseilles and Algiers, while the Cie. Messageries Transaeriennes revived a scheme for a seaplane service between Marseilles and Alexandretta (Syria), via Corfu and Athens, for which the French Government is providing a subsidy of 1,500,000 fr. for the preliminary work this year.

Austria.—Complete statistics for 1926 for this country are not available, but it is stated that there was a considerable improvement in 1926 traffic as compared with 1925. The following services were operated during 1926:—Vienna-Budapest; Vienna-Graz-Klagenfurt-Venice; Budapest-Graz; Vienna-Innsbruck. These services were operated by the Oesterreichische Luftverkehrs A.G., in conjunction with Lufthansa and the Italian Soc. Transadriatica.

Belgium.—The Belgian S.A.B.E.N.A., in April of 1926, opened a daily service between Brussels and London, via Ostend, until the winter. The same company's air route in Belgian Congo (N'Gule (Kansenia)-Kinshara-Boma), showed increasing success in its operation. During the first eight months of 1926 a total distance of 54,100 miles was flown, and 491 passengers, about 25 tons of mails, and 1¼ tons of goods were carried.

Czechoslovakia.—While the number of miles flown on the State air.. nes during 1926 (148,125) was less than in 1925 75,760), the number of passengers carried was 148,125 as against 604 in 1925. The amount of goods carried (11 tons) was also less, but mails increased from ·48 tons to 2·8 tons. The State air lines include Prague-Bratislava-Kosice, and a new service between Prague and Brno. The Prague-Marienbad route was operated as usual by the "Aero" Co., the figures for 1926 over this section being:—miles flown, 22,770; passengers, 374; goods, 4·8 tons; mail, 0·07 tons.

Denmark.—The Danske Luftfartselskab operated, during 1926, air services between Copenhagen-Hamburg-Cologne, the traffic figures being:—miles flown, 126,730; passengers, 1,032; goods, 26·37 tons; mail, 1·05 tons. Except in the case of goods and mails these figures show a decrease on those of 1925.

Finland.—Air traffic in Finland showed a considerable increase during 1926. On the Helsingfors-Stockholm service—operated alternately by the Finnish Aero O/Y and the Swedish A.B. Aerotransport (June-September)—699 passengers, 2 tons of mail, and 11 tons of goods were carried. On the Helsingfors-Reval service—operated in conjunction with the Esthonian "Aeronaut" Co.—2,292 passengers, 8½ tons of mail, and 30 tons of goods were carried.

Holland.—Continuing its policy of expansion during 1926, K.L.M. extended the Rotterdam-Amsterdam-Copenhagen service to Malmo. The statistics for the period were:—miles flown, 597,500; passengers carried, 5,616; goods and mails, 255 tons.

Italy.—Considerable progress in civil aviation was made in Italy during 1926 and a number of air lines were put into operation:—Brindisi-Athens-Lemnos-Constantinople; Genoa-Rome-Naples-Palermo; Turin-Venice-Trieste; Trieste-Venice and Zara; Venice-Vienna. Negotiations took place between the Lufthansa and the Aero Lloyd Italiano with a view to the establishment of air services between Italy and Germany during 1927.

Poland.—The Polski Aerolot company augmented its services during 1926 and operated the following lines:—Danzig-Warsaw-Lemburg; Lemburg-Cracow-Vienna; Warsaw-Lodz-Cracow; The Aero company also recommenced its service between Posen and Warsaw.

Soviet Russia.—During 1926 the Derluft Co. extended its Konigsberg-Moscow service to Kharkov, and during the period May 1 to October 31 covered about 311,000 miles; the service was then suspended for the winter. Regular services were operated by the Dobrolet Co. on the following routes: Kagan-Khiva-Tashauz; Kagan-Termes-Diushambe; and Verkhny-Udinsk-Ulan Batoi (Urga). The Ukrvozdukhput operated on the route Moscow-Orel-Kharkov-Artemovsk-Rostov (Don)-Mineral Waters-Grozny-Baku-Tiflis.

Sweden.—The A/B Aerotransport recommenced operations in April, 1926, with the re-opening of the Malmo-Amsterdam service, and later shared with the Lufthausa the Malmo-Berlin service. See also Finland.

Switzerland.—The following regular services were operated by Swiss air transport companies during 1926:—Geneva-Lausanne-Zurich; Zurich-Stuttgart; Basle-Stuttgart; Basle-Karlsrhue-Frankfurt; Basle-La Chaux-de-Fonds; Basle-Geneva-Lyons-Marseilles; Basle-Zurich; Basle-Lausanne-Geneva. The figures for these routes are:—miles flown, 210,340 miles; passengers, 2,345; mails, 20 tons; freight, 7½ tons.

Other Countries.—In Asia, some progress was seen in Japan, where the Japan Aviation Co. conducted trial flights between Osaka and China with a view to establishing regular services. In South America, it seems that the greatest activity took place in Colombia, where S.C.A.D.T.A. continued their successful operations. The Condor Syndicate, which is associated with this company, has concluded an agreement with the Government of Guatemala regarding the inclusion of that country in a circular seaplane service between the Isthmus of Panama and Havana, or a port in the U.S.A. It is also reported that a similar agreement has been signed with the Government of Nicaragua. A Colombian oil concern, the Andian National Corp., purchased a Sikorsky 32 machine and placed it in service on the Magdalena River for carrying correspondence and personnel from Cartagena to the oil field, a distance of about 350 miles.

In the Argentine the Junkers Co. have continued to operate the air mail and passenger service between Buenos Aires and Montevideo. The Lloyd Aero Boliviano, a company formed in Bolivia by the Junkers Mission, was granted a concession for the operation of air lines for a period of six years, and operated a somewhat irregular service between Cochabamba and Santa Cruz.

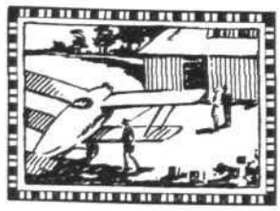
Several air transport schemes were planned during 1926 in Brazil, tenders being called for by the State of Minas Geraes for a service between Bello Horizonte and Rio de Janeiro, while it was proposed to form a company (Empreza Aerea Rio Grandense), using German aircraft to operate three services from Porto Alegre to Rio Grande, Santa Maria, and bathing beaches (Atlantic coast) respectively.

Finally, we come to the U.S.A. The most important event of 1926 was the Civil Aviation Bill, introduced by Senator Bingham, which became law on May 26. In accordance with its provisions, a Bureau of Commercial Aviation has been established within the Department of Commerce in the charge of a new Assistant Secretary of Commerce, who is to be responsible for the issue of general regulations governing air traffic, the registration of machines and issue of certificates of airworthiness, etc.

While every branch of civil aviation in the U.S. progressed rapidly during 1926, the greatest activity was with the air mail routes. We have already made frequent reference to these air mail services, so we need only conclude here in giving the total traffic carried out on these routes up to the end of December, 1926, viz.:—Total length of routes, 9,119 miles; miles flown: post office routes, 2,292,263; contract routes, 2,115,000. Mails carried: post office routes, 433,649 lbs.; contract routes, 376,205 lbs. (Note.—6,000 passengers carried on contract routes.) Total miles flown, 4,407,263. Total mails carried, 809,854 lbs

FLIGHT
THE AIRCRAFT ENGINEER AIRSHIPS

PRIVATE FLYING



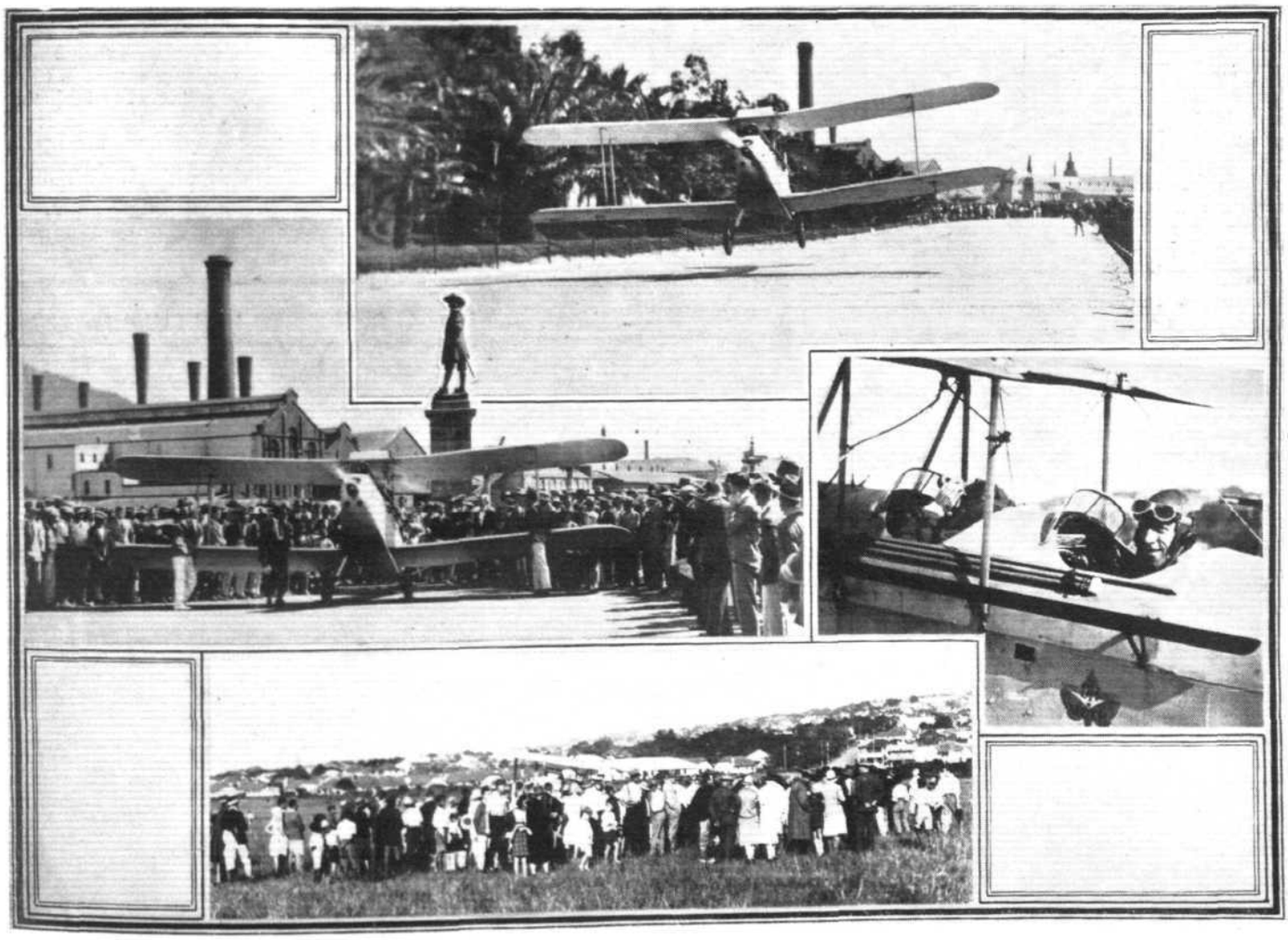
A Section of FLIGHT in the Interests of the Private Owner, Owner-Pilot, and Club Member

TOURING SOUTH AFRICA IN A LIGHT 'PLANE

MAJ. A. M. MILLER, D.S.O., M.L.A., recently completed a tour of South Africa in eight days in a "Moth" christened *The Point*, and flying the Ancient Order of Froth Blowers' pennant from one of the wing struts. Such was its importance in the aviation history of the country that some of the local papers devoted a whole page to the event. Maj. Miller was accompanied by a South African motoring journalist, Mr. J. G. Dunn, who apparently had no previous experience of flying. The public followed every phase of the flight as we do of Atlantic and India flights. The chosen route was from Cape Town round the south and east coast to the Usutu River, then inland in a westerly direction to Pretoria, returning across country in a roughly parallel curve. It was not without many incidents like forced landings, fights with gales, and losing the course, but the machine came through splendidly considering the various conditions met with. As the object of the flight was to interest the public in flying it was a good policy to start, in spite of very bad weather at Cape Town. Amidst rain and mist which hid the mountain the "Moth" took off, well loaded with luggage, just after 1 p.m. on a Friday, and headed in an easterly direction for Sir Lowry Pass, Hottentot Holland Mountains, and Mossel Bay. The mist enveloped the machine like a blanket, even obscuring the wing-tips, until an altitude of 10,000 ft. was gained, when the cloud banks fell below, stretching away like beautiful snow hills, whilst the sun gleamed, although the air was very cold. Stray clouds occasionally covered them still and, altogether, the "Moth" was in and out of clouds for three-quarters of an hour, during which time the Hottentot Holland Mountains were passed over.

Losing the Way

Then came a definite break in the mist and a railway was sighted, towards which a dive was made through the lowest layers of cloud until these were cleared when 200 ft. above ground. At this juncture, Maj. Miller, who had no compass, made a mistake in navigation. It appeared that on dropping out of the clouds they came immediately above the town of Swellendam on the direct route to Riversdale, but for some reason it was not sighted, and a bend in the railway line a few miles ahead deceived the pilot with regard to his course. In the circumstances he decided to make for the coast in the south and follow it along to Mossel Bay. A very low altitude was kept at this stage and rainstorms continually marked the

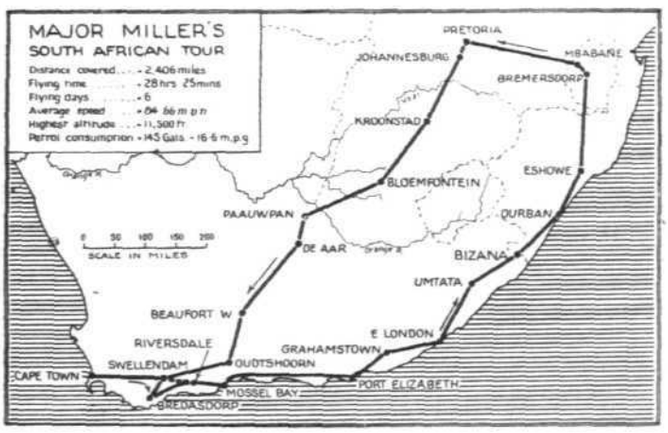


AROUND SOUTH AFRICA IN A WEEK: Some pictures from Maj. Miller's fine tour. Above, the start from the quayside at Cape Town. On the left, the "Moth" just before the start, the statue behind it being that of Van Riebeek, the first European to land at Cape Town. On the right, Maj. Miller in the cockpit of the "Moth"; and below, an admiring crowd at Durban.

flight, but at last a town came in sight and was recognised as Bredasdorp. This was a guide, and instead of continuing to the coast as planned, an up-country route to the north-east was struck which brought them to Heidelberg, very close to the original route. This deviation had resulted in a V-shape course nearly to the coast and back. Just after leaving Heidelberg the "Cirrus" Mark II cut out, apparently through the main tank running dry, but it restarted when reserve fuel was turned on. When a little later another town was seen, which proved to be Riversdale, a landing was made for refuelling of the tanks just outside the town in a field strewn with big stones and having a very rough surface. This was the first forced landing, for Mossel Bay was the proposed destination on the first stage, although considering the weather conditions and the consequent necessity of making navigation almost guess-work it could hardly be wondered at. Rain and pressing hospitable invitations combined to keep them there for the night. A show ground committee offered the use of a shed on their ground for the comfort of the "Moth," but the ground was not very big and it was also surrounded by tall trees, making a landing a very hazardous adventure. The Major attempted it, however, flying solo, after the tank had been replenished, and got in skilfully with a side-slip landing after gliding in over the trees. It was one of the best landings of the trip. This stage had taken 2 hrs. 10 mins. for a distance of 225 miles.

The Second Stage

To get out again on the following morning naturally presented an equally skilful and risky task. It was managed through a gap in the trees which left a few feet to spare, although it became necessary to bank to avoid one of the trees. As soon as they climbed, Mossel Bay could be seen, and it was reached in half-an-hour and a landing effected after circling the town. Here arrangements had been



This map shows in detail the course round the Union of South Africa that was followed by Major Miller and his passenger in their "Moth" called "The Point." The flight aroused considerable public interest in the Colony.

made for the supply of Atlantic motor spirit. After staying half-an-hour a start was made in the direction of Port Elizabeth, and this coastal trip was most impressive for its scenery. It is a coast of endless hills and forests and is spoken of as the Valley of a Thousand Hills. A landing was made at Port Elizabeth in a high wind, and lunch taken in town. Here they met the first prospective buyer of a "Moth" for business purposes, who was given all the practical knowledge that he required. He proved to be the forerunner of many other interested people, so the journalist accompanying the Major learned a string of answers off by heart and rattled them off on the slightest provocation. The low-running cost of the "Moth" seemed to be a surprise to very many. This stage, Mossel Bay-Port Elizabeth, was 210 miles in length and took 1 hr. 50 mins. with the help of a following wind. Grahamstown was the next place visited, and then East London, this latter lap being one of the fastest runs of the tour. The speed worked out at 120 m.p.h. There was a most enthusiastic reception of the "Moth" at East London. The Light Aeroplane Club entertained the aviators to dinner and they stayed the night. This Club is apparently only in formation now and is expecting to possess some "Moths" to start flying. The machine had a night out here, but there was no reluctance on the part of the engine the next morning. Again, averaging a speed of 120 m.p.h., Umtata was reached an hour before they were expected, and for 20 mins. the town was circled before a landing was made to take on more fuel.

High Flying

Since the start from Cape Town they had mostly flown at an altitude of 4,000 ft., except for the first day. From Umtata there was some very hilly country to cross, and an altitude of 10,000 ft. was reached to surmount a huge range like the Valley of a Thousand Hills, but from that eminence visibility was excellent, the sea and Port St. John's being sighted, and later, Port Shepstone, and even the Durban Bluff. A landing was made at Bizana, on the golf course, where, a few days previously, the Air Force machines passed The natives were very interested in the "Moth," and the herd boys, who could not leave their cattle, brought them along with them.

Durban was reached that day about 4 p.m., the scenery changing as the town was approached, the black lines of the light railways creating a sort of jig-saw puzzle of the sugar fields. It could be seen how thickly the Natal coast was populated between Port Shepstone and Durban, and possessing consequently vast possibilities for air transport. There are three ports within a fairly short distance of each other, yet without direct rail communication. The roads are bad, too. On this third day of the tour 308 miles were flown in 2 hrs. 55 mins. flying time.

Above the Big African Rivers

From Durban the route now led through Zululand to Swaziland, the feature of the scenery being the big rivers which were always in sight, seemingly winding on endlessly through the country. At Eshowe, where arrangements had been made for fuel supplies, they alighted on the golf course and thereby caused a sensation, for the Easter sports were on and a golf tournament was interrupted. For this behaviour the "Moth" was left in the rough whilst the game proceeded. Interest here was focussed in the first attempt of the "Moth" to get off with its load at an altitude of 2,000 ft., above sea level. The landing ground was only 120 yards and was surrounded by wired fences. The take-off was up-hill and it was managed in a distance of 100 yards, thus leaving an ample margin. Rough bush country was crossed from Eshowe to the Usutu River and the natives were seen diving into their huts for protection. In Swaziland the Major was with his own people, and the journalist parted company with him for a day whilst he flew on to Stegi, Bremersdorp and Mbabane, giving joy rides. Between the last two places the road journey in a fast car takes an hour: the "Moth" took eight minutes. The next stage to Pretoria, 200 miles, took 2 hrs. 15 mins. and was one of the longest non-stop flights of the tour. They only just got on to Roberts' Heights aerodrome before the fuel ran out. A good ascent was made at that high altitude, and also at Johannesburg, the next place, which is 6,000 ft. above sea level Here the greatest interest was aroused in the visit, the Light Aeroplane Club welcoming the aviators. Later it was decided to recommend to the committee the purchase of a machine for the club.

Returning Home

The homeward journey had now commenced on a roughly parallel curve to the outward course, and Major Miller decided to accomplish 700 miles in one day, leaving an easy run into Cape Town, but bad weather hindered this intention and stops were made at Kroonstad for fuel and Bloemfontein. After this a strong head wind again upset the progress, with the result that a forced landing was necessary at the wayside station at Paauw Pan for fuel. They were two hours behind schedule at De Aar, the ground speed dropping to 57 m.p.h., and Beaufort West was picked for the night's rest instead of Oudtshoorn. The day's flying totalled 7 hrs. 20 mins. for 568 miles. They had started at 6.30 a.m. and finished at 4.30 p.m. On the Saturday, the last day of the flight, the weather was perfect at the start and the Zwartz mountains were passed over at 11,500 ft. Leaving Oudtshoorn the Lange Bergen was crossed to reach Swellendam, the last but one landing place of the tour. It was the final lap to Cape Town that proved to be the worst of the many experiences. There was a strong head wind, in spite of which good progress was made up to Caledon. Then they stuck fast in the gale for some time and later met its full force at Bot River. The "Moth" went rolling, pitching, tossing and shuddering, dropping 200 ft. in one bump and pulling up as though it had hit earth. It took them all their time to stick on the seats. The ground speed dropped to 47·6 m.p.h. After struggling out of the pass they found a comparative calm in the open behind the peninsula and so they survived, landing at Cape Town tired but happy. They had covered 2,406 miles in 28 hrs. 25 mins.

FLIGHT
AIRCRAFT ENGINEER AIRSHIPS

"MOTH" BUYERS

IT is very interesting to know that there is quite a steady market for some light aeroplanes, that is, considering how new the market still is. For instance, there is a light aeroplane called the "Moth," which some of our readers will have heard of, that is constantly finding buyers. Captain de Havilland himself may shortly turn in his present machine, G-EBNO, and have instead one of the new X-type with the dropped engine. Lieut. Llewelyn George Richardson, R.N., has purchased a "Moth," registered as G-EBPQ. He is at present serving with the Fleet Air Arm. He keeps his machine at Gosport, and during the last two months he has done a large amount of touring with it. G-EBQJ is Mr. Denis M. Rooke's machine. He is the Australian who is flying to Australia, and recently reached Basra, and is now on his way to Karachi. His "Moth" is named *Marjorie*. Captain W. R. Bailey owns G-EBQY, and usually keeps it at Stag Lane. Recently he took it with him whilst camping with the Gloucester Hussars, and uses it quite regularly between London and Porthcawl, where he plays golf. Captain Eric Hayes has G-EBQW. He landed at Stag Lane one afternoon lately with his left arm in a sling, and he explained quite seriously that as he had dislocated his shoulder bone in a motor-cycle accident, flying was now the only way he could get about country.

To drive a car or motor-cycle required two hands, and the jolting on the roads was liable to give him pain. The jostling in trains, too, put them out of the question. So the aeroplane was the only alternative. There was no jolting, and he could manage quite well with one hand. He left Shrewsbury early one morning, flew to Carlisle and had breakfast, then Gleneagles and had lunch, then flew back to Shrewsbury in the evening. 398

Moth G-EBQZ has been delivered to Mr. Gerard Merton, who keeps it at Stag Lane. He is interested in astronomy, and is having his "Moth" especially equipped to fly in the wake of the forthcoming eclipse and make observations. G-EBRU is Mr. Ivor H. McClure's, a member of the London Aeroplane Club, who has just taken his ticket. He left for Dieppe with Mr. Tapper, another member of the London Club, recently, and intends to visit Le Mans to see the famous Grand Prix Motor Race. Amongst the machines to be delivered shortly, all being of the new type with dropped engine, are G-EBRI for the Duchess of Bedford, which will be kept at her estate at Woburn Abbey; G-EBRT for Mr. A. C. M. Jackaman, another member of the London Club, who, incidentally, arranged the purchase of his "Moth" through Messrs. William Whiteley, the big London Stores, who are taking his three-litre Sunbeam car in part exchange. G-EBSA is for Major G. C. Maxwell, who is the concessionnaire in this country for Chrysler cars. There are quite a number of other orders in hand, but these are not due for delivery for a month or so yet.

LIGHT 'PLANE CLUBS

LONDON AEROPLANE CLUB

THE flying time for the week ending June 19, was 10 hrs. 55 mins.

Pilot Instructors.—Capt. F. G. M. Sparks, Capt. S. L. F. St. Barbe.

Dual Instruction.—A. J. Richardson, J. H. Veasey, L. Daniels, J. R. de Havilland, Miss Spooner, B. G. Luff, O. J. Marstrand, W. Biheller, Col. Winby, L. W. Gibbens, Lady D. Hamilton, P. W. Hoare, R. Malcolm, G. Black. G. E. Clair. Solo Flying.—W. Hay. Passenger Flights.—S. O. Bradshaw.

Two Club "Moths" are now in the works for annual reconditioning. The "Bristol" Brownie is expected back from Hamble this week.

HAMPSHIRE AEROPLANE CLUB

REPORT for week ending Sunday, June 19.—Total flying time: 12 hrs. 35 mins. Instruction flying: 7 hrs. 20 mins. Solo flying: 4 hrs. 30 mins. Joyrides: 10 mins. Test flights: 35 mins.

The following members had instruction:—Messrs. L. Taylor, 3 hrs. 45 mins.; M. Hamilton Fletcher, 30 mins.; Commander A. W. Hunt, 30 mins.; T. F. Brewster, 25 mins.; W. M. Wall, 25 mins.; W. D. Cox, 20 mins.; B. Whittle, 15 mins.; F. G. Moloney, 15 mins.; V. F. Nicholson, 15 mins.; R. H. Chaffey, 15 mins.; A. L. Fortlage, 15 mins.; and W. P. Courtney, 10 mins.

The soloists were Don J. de la Cierva, 2 hrs. 10 mins.; E. I. C. Wyllie, 1 hr.; Capt. Yeatman, 30 mins.; L. A. W. Deane, 25 mins.; V. F. Nicholson, 15 mins.; D. L. Rumble, 5 mins.; and K. P. L. Bowen, 5 mins.

Mr. Pulman had a joy ride with Capt. Thomson and Mr. Copland flew with Mr. E. I. C. Wyllie for 20 mins.

F/O. Overbury, R.A.F., will represent us at Bristol on Wednesday, the 22nd.

There is a lack of incident to report this week, but we rejoice in having enrolled a member of the Police Force, who intends to learn to fly. The writer is afraid to mention his name, in case this arm of the law should have any objection to seeing his name in print; he is a full-scale officer and one has a wholesome fear of a blue uniform.

LANCASHIRE AERO CLUB

REPORT for week ending June 18.—Dual with Mr. Brown: Miss Baerlein, 50 mins.; Messrs. Leeming, 50 mins.; Hartley, 45 mins.; Nelson, 40 mins.; Keay and Harber, 30 mins. each; Schilfield, 25 mins.; Torres Ruddy and Shiers, 20 mins. each; Stonex, 15 mins.; Goodyear, 10 mins.

Solo.—Messrs. Lacayo, 45 mins.; Costa, 40 mins.; Nelson, 20 mins.; Gattrell, Chapman, and Hardy, 10 mins. each.

Joy-rides.—With Mr. Cantrill: Messrs. Kenyon, Wareing, J. Kenyon and Allen. With Mr. Costa: Miss Shatwell. With Mr. Brown: Mr. Watson. With Mr. Scholes: Miss Ainsworth; With Mr. Lacayo: Mr. F. Scholes.

Test-flights.—35 mins. Total, 10 hrs. 15 mins.

It is over three months since the club had such a low flying return to record. For once in a way, the weather has little to do with it, and lack of enthusiasm certainly plays no part. Those inveterate boosters of flying hours, the Flying Sub-committee, are primarily responsible, for they have decreed that no more flying shall be done by our Mark I Cirrus engines until such time as they have been fitted with the latest modified valve-seatings. One must admit that on the face of things, their decision is a wise one. The country surrounding the aerodrome is not too good for forced landings, and there is not one of our instructors who has not at one time or another had to "put in all he knew" to escape a crash through this same trouble. The climax was reached at the beginning of last week, when, with an engine only recently sent back to us after complete overhaul, Mr. Brown was brought down with one valve-seating adrift, and two more on the point of going. He got down safely with much credit to himself and the Moth.

One records the foregoing in extenuation of low flying hours, rather than in any spirit of criticism of the engine design, which has won enough laurels in any case to escape injury by criticism. One has a great admiration in many ways for the Cirrus Mark I, and a considerable hankering after the Mark II, but our club engines are among the earliest of their type and however much one may spend on fitting modifications and replacements they cannot be expected to go on for ever. The ground engineer has certainly done his damnedest, and no doubt the engines have done theirs. Meanwhile, "Thank Gawd for the Renault-Avro."

One may add that a strong feeling is growing up in the club that we ought not to wait any longer for a decision from the powers that be as to whether they wish us to continue flying or not. The aerodrome has all the making of a fine natural golf course, and now that the club-house is all poshed up it seems foolish to keep on with this flying business.

MIDLAND AERO CLUB LIMITED

REPORT for week ending June 18:—

The total flying time was 14 hr. 49 mins.

The following members were given dual instruction: J. Edwards, Capt. J. E. Brewin, V. de Satge, J. C. Rowlands, E. P. Lane, R. D. Bednell, N. Crane, R. L. Brinton, R. L. Jackson.

Solo:—W. Swann, E. J. Brighton, R. L. Jackson, C. Fellowes, G. V. Perry. Passenger flight:—A. B. Aston.

Very little flying was possible on Saturday owing to a gale.

Congratulations to Mr. W. L. Handley on winning the Lightweight T. T. Race, and Mr. H. J. Willis on coming in second in the Junior Race, both of whom are members of the club.

NEWCASTLE-UPON-TYNE AERO CLUB

REPORT for week ending June 5.—Total flying time: 36 hrs. 10 mins. QV, 17·25; LX, 15·15, RK, 2·10.

Dual with Mr. Parkinson:—Mrs. Heslop, Miss Leathart, Dr. Watt, Messrs. Elmes, Thirlwell, Heaton, Jewett, Wilson, G. Shaw, Gibson, George, Macalpine Downie, Pargeter, Bainbridge, and Capt. Milburn.

Solo:—Capt. Milburn, Miss Leathart, Drs. Dixon and Watt, Messrs. Leech, R. N. Thompson, C. Thompson, Mathews, H. Ellis, Turnbull and W. B. Ellis.

Report for week ending June 12.—Total flying time: 44 hrs. 20 mins. QV, 23·10, LX, 16·10, RK, 3·00.

Dual with Mr. Parkinson:—Sir J. Reed, Craig, Elmes, Jewett, Thirlwell, Gibson, Heaton, Turnbull, Wilson, Phillips, H. Ellis, Davey, Miss Leathart, and Mrs. Heslop.

Solo:—Miss Leathart, Messrs. Turnbull, H. Ellis, R. N. Thomspson, C. Thompson, Leech, W. B. Ellis, Phillips, Dixon, Todd and Mathews.

Report for week ending June 19.—Total flying time: 23 hrs. 20 mins. QV, 12·05; LX, 10·50; PO, 30 mins.

Dual with Mr. Parkinson:—Mrs. Heslop, Messrs. Rasmussen, Elmes, Jewett, Heaton, Turnbull, Wilson, Irving, W. Todd, Davey, Maxwell, Pargeter, and Flying-Officer Dawson.

Solo:—Flying-Officer Dawson, Dr. Dixon, H. Ellis, Turnbull, C. Thomson, R. N. Thompson, Mathews, W. B. Ellis.

On Tuesday, Mr. Parkinson flew to Edinburgh, returning with Sir Sefton Brancker. After tea, Sir Sefton Brancker continued his journey to Sherburn in a Yorkshire Club Moth piloted by Mr. Fielden.

Friday saw LX off service, and gales prevented any flying on Saturday and Sunday.

The Secretary is still confined to his bed, but it is a pleasure to report that he is making slow but steady progress.

YORKSHIRE AEROPLANE CLUB

REPORT for the week ending June 18.—Total flying time 21 hrs. 15 mins. Instruction with Mr. Beck, 11 hrs. 40 mins. Solo, 3 hrs. Cross country, 6 hrs. 5 mins. Tests, 30 mins.

The following members took dual with Mr. Beck:—Capt. Milburn, Miss Woodhead, Messrs Brackenbury, Miller, Priestly, B Dawson, Swift, Williams, Gratwick, Bailey, Crouther, L Dawson, R Lax.

The soloists were Messrs Norway, L Dawson, Henry Leatham, Mann, Fielden, Wood, M. Lax, R. Lax, Clapham.

This has been a poor week for mushrooms.

In regard to our secondary activity, we have not done much flying this week either. Both the Avro and one Moth have been out of commission with internal disorders. Our sole remaining Moth was definitely out of sorts on Sunday morning, but recovered after a certain operation carried out with considerable skill by Mr. Broad on his way south on Sunday afternoon.

On Tuesday we had the pleasure of fetching Sir Sefton Brancker from Newcastle, and bringing him down to Leeds. On Wednesday we took him on to Brough and Howden, finally landing him on the Knavesmire at York.

On Saturday, Mr. Clapham departed with a machine to Keighley, where he gave a display in aid of the local hospital.

The New Craze—Flying the Atlantic

To be in the fashion in the aeronautical world today you must be preparing to fly the Atlantic. Everybody is doing it. From nearly all quarters of the globe come reports of somebody who is going to emulate Lindbergh, Chamberlin and Levine. If it goes on we shall soon suspect everybody seen loitering at an aerodrome of waiting for an Atlantic weather report. An American woman pilot, Mrs. Luba Phillips, who holds the world's altitude record for women, proposes to fly the worn trail and give it a touch of originality in the tail by going to Rome from New York, and then London. She is said to be starting in July, accompanied by a mere man, name unknown up to going to press. Captain F. T. Courtney, in conjunction with *The Westminster Gazette*, has been quietly preparing his plans for a return flight to New York for some time, and he is practically ready. In a few days he will take over his machine, a Dornier-wal monoplane flying boat, fitted with two Napier 450 h.p. engines in tandem. It is now being completed at Friedrichshafen, where his second pilot, Flight-Lieut. F. W. M. Downer, and mechanic, Mr. R. F. Little, are already arrived. Wireless transmitting and receiving sets, having a range of 600 miles, will be used. The start will be from Southampton and the course followed will be via Ireland and Newfoundland to New York. Here he will stay no longer than is necessary in order to make the return flight in the quickest possible time. The flight from New York of Commander Byrd, which has been delayed so long, is expected to start any time now. He, too, will make a return flight if possible. Herr Anton Könnecke, a famous German war pilot, and now with Lufthansa, is—according to *The Times* correspondent—preparing for a flight from Berlin to San Francisco via the Azores, without any intervening landing, however, merely circling at places like New York to drop mail bags. After a rest of two or three days he will return, landing this time at New York to pick up mails. His machine will probably be a three-engined type, although the design is not yet decided upon. It may have one B.M.W. VI engine and two Wright "Whirlwind" engines.

Lindbergh, Chamberlin and Levine

COL. LINDBERGH arrived at St. Louis, on June 18, after his tremendous welcome in New York, and the city attained new heights of noisy enthusiasm. They had an orchestra equipped with acetylene-gas tanks, played upon with sledge hammers and riveting tools, producing a rapturous cacophony. Mr. Clarence Chamberlin and Mr. Levine left Berlin on June 19 in their Bellanca monoplane for Munich and Vienna. Two other machines escorted them south, one being a three-engined Rohrbach "Roland" monoplane, and the other was a three-engined Junkers G 24 monoplane. These carried a number of passengers, including Mrs. Chamberlin and Mrs. Levine.

Wreckage of Saint Roman's Machine Found?

IT seems probable now that wreckage found off the coast of Brazil is that of Capt. Saint Roman's machine. It will be remembered that he disappeared on his South Atlantic flight, after leaving Senegal, on May 5.

Prince George's Flight

PRINCE GEORGE flew from Paris to London on the evening of June 20, in an Imperial Airways Handley-Page liner, following his visit of several weeks' duration to the Continent. The pilot was Capt. Jones, who also flew the Prince of Wales to London during the general strike last year. The machine left Paris at 4.6 p.m. and reached Croydon at 6.45 p.m.

Some Current Flights

MR. VAN LEAR BLACK, the American newspaper owner, who is flying from Holland to Batavia in a Fokker F7 monoplane, arrived at Baghdad on June 19, from Aleppo. Capt. Kingsford Smith and Mr. Ulm, who left Sydney, Australia, for Brisbane in a Bristol biplane fitted with a 240 h.p. Siddeley "Puma," made a forced landing at Boolaroo, owing to slight engine trouble, and returned to Sydney. They were attempting to circle Australia in 11 days. Herr Ferdinand Schulz, who has made many gliding records in Germany, crashed at the Langfuhrer Aerodrome, Danzig, on June 17. He was flying a light aeroplane to Marienburg, and fell from 100 ft. while circling the aerodrome after his start. He is suffering from cuts and slight concussion, but his condition is not serious.

Birmingham Air Pageant

ON July 16 there will take place at Castle Bromwich, on the spacious grounds adjoining the buildings in which are held annually the British Industries Fair, a huge Air Pageant, in which some of the best-known flying men will take part.

The work of organising this event is well in hand, and to ensure its success whole-hearted co-operation of the Royal Air Force, the Warwickshire Auxiliary Air Squadron, the Midland Aero Club, and a number of aircraft manufacturers will be forthcoming. In a carefully arranged programme (the first of the kind to be presented in the Midlands) aviation will be demonstrated from many and varied aspects.

From 10 a.m. until 12.30 p.m. there will be facilities for passenger flights, and similar provision will be made in the early evening—that is, at the conclusion of the programme. Early in the afternoon the start will be made of a 200-mile race for the Air League Cup, and later a variety of events will be gone through. Instructors from the Royal Air Force Flying School will give a display. There will be "crazy" or acrobatic flying by a squadron leader; a low bombing attack will be followed by an aerial combat; and another feature of fascinating interest will be air drill by machines which will manœuvre in close formation in accordance with orders given by wireless telephony.

The Warwickshire Squadron will make itself responsible for a set piece, which will include the blowing up of a building, and in the "Grande Finale" all the machines will "take off" simultaneously and fly away. The programme will also include several air races, and for one of these the Birmingham Cinema Exhibitors have provided a silver cup.

The charge for admission will vary from 1*s.* to 5*s.*, and there will be a special enclosure known as the "Lord Mayor's Enclosure," for which the charge will be £2 2*s.*, including luncheon, tea and car parking.

In all the huge enclosures, from which a full view of the whole proceedings can be obtained, provision will be made for refreshments. There are, too, ample facilities for the parking of motor-cars.

For the convenience of visitors special arrangements have been made for quick and regular services by trams, omnibuses or on the railway, and it may be added that special trains at excursion rates will be run from "Midland" stations as far as 60 miles distant. Everything points, indeed, to the fact that the Pageant will, by reason of its comprehensive character, make a most popular appeal to all classes, including those whose interest in aviation is only superficial.

Leonardo da Vinci's Flying Machine

ONE of a series of more than fifty free lectures open to the public in connection with the Centenary celebrations at University College, London, is an address in the Department of Anatomy there by Dr. Ivor B. Hart, on June 28, on "Leonardo da Vinci's Flying Machine."

The R.A.F. Dinner Club

THE R.A.F. Dinner Club—founded in 1923—hold their annual dinner for past and present officers of the R.A.F. (or R.N.A.S. and R.F.C.) on July 2, the eve of the R.A.F. Display, when so many members of the services are gathered near London. The Secretary asks that secretaries of unit dinners, particularly those who are experiencing trouble in getting their members together for annual dinners, should communicate with him at Bentley Priory, Stanmore, Middlesex.

Sir Richard Glazebrook

THE Secretary of the Department of Scientific and Industrial Research announces that Sir Richard Tetley Glazebrook, K.C.B., F.R.S., has been appointed, by Order of Council dated May 26, 1927, to be a member of the Advisory Council to the Committee of the Privy Council for Scientific and Industrial Research.

FLIGHT
AIRCRAFT ENGINEER AND AIRSHIPS

THE ROYAL AIR FORCE

London Gazette, June 14, 1927

General Duties Branch

Flying Officer M. H. Jenks (Capt., Glos. Regt. R.A.R.O.) is transferred to the Stores Branch on probation; May 30. Flight-Lieut. J. A. G. Haslam, M.C., D.F.C., is placed on retired list at his own request; June 10. Flying Officer F. W. M. Downer is transferred to Reserve, Class A; June 10. *Gazette* May 3 concerning Flying Officer A. L. Ottway is cancelled.

Stores Branch

The following officers are transferred to Reserve, Class B. (June 17):—Sqdn.-Ldr. E. D. Galloway, Flying Officer L. R. Peirce. The following are transferred to Reserve, Class C. (June 17):—*Squadron-Leaders.*—T. G. Gordon, M.B.E., W. L. Shaw, M.B.E.; G. E. Stagg, M.B.E. *Flight-Lieutenants.*—R. Adams, H. B. Hawker, J. Roberts, J. A. Plunkett, T. Surr. *Flying Officers.*—R. Q. Bamber, R. Bassett, F. A. Ormerod, H. J. Thomas, C. St. J. Vaughan.

Accountant Branch

Flight-Lieut. (Acting Sqdn.-Ldr.) G. H. White (Capt. and Assistant Paymaster, R.A.P.C.) relinquishes his temp. commn. on return to Army duty; June 13.

Medical Branch

The following are granted short service commns. in the rank of Flying Officer for three years on active list, with effect from and with seny. of June 1:—E. P. Carroll, G. W. McAleer, M.B.

RESERVE OF AIR FORCE OFFICERS

General Duties Branch

C. W. Harvey is granted a commission in Class AA General Duties Branch, as Pilot Officer on probation; May 16. (Substituted for *Gazette* May 31): J. R. Wardrop is granted a commission in the General Duties Branch, Special Reserve, as a Pilot Officer on probation; June 14.

The following officers on probation are confirmed in rank:—*Flying Officers.*—A. J. G. Anderson, E. B. Worsley Bartlett, W. G. Gunning, R. H. Lemon; June 7. *Pilot Officers.*—F. G. Wayman; June 1. Lt. J. C. Harding; June 7. J. H. Simpson, R. E. Watson; June 14.

Pilot Officer S. Summerfield is transferred from Class C to Class AA; June 1. The following are transferred from Class A to Class C:—Flight-Lieut. E. E. Deans, D.S.C.; June 14. Flying Officer T. W. G. Cattell; June 3.

ROYAL AIR FORCE INTELLIGENCE

Appointments.—The following appointments in the Royal Air Force are notified:—

General Duties Branch

Squadron Leader J. Noakes, A.F.C., M.M., to Central Flying School, Wittering, 15.6.27.

Flight-Lieutenant E. S. Goodwin, A.F.C., to No. 480 Flight, Calshot, 13.6.27.

Flying Officers J. M. Wyer, M.B.E., D.S.M to. No, 1. School of Tech. Training (Apprentices), Halton, 1.6.27. R. H. S. Spaight, to No. 208 Sqdn., Egypt, 11.5.27. T. H. Perry-Keene, to R.A.F.M.T. Depot, Shrewsbury, 1.6.27. R. J. Montgomery-Moore, to R.A.F. Station, Duxford, 3.6.27.

Flying Officers: R. A. King, to R.A.F. Depot, Uxbridge, 14.5.27. S. N. Webster, A.F.C., and H. M. Schofield, to Marine Aircraft Experimental Estab., Felixstowe, 1.6.27. J. A. Tindall, to No. 502 Ulster (Bombing) Sqdn., Aldergrove, 26.5.27.

Pilot Officers: L. H. Smith and C. F. Ashton, to No. 4 Squadron, S. Farnborough, 11.5.27. A. Allen, to No. 11 Sqdn., Netheravon, 23.5.27. E. S. Baverstock, to No. 13 Sqdn., Andover, 11.5.27. M. R. Edmondes, to No. 111 Sqdn., Duxford, 23.5.27. L. E. R. Fisher, M.C., to No. 12 Sqdn. Andover, 17.5.27. C. H. Hockley and L. T. Keens, to No. 13 Sqdn., Andover, 17.5.27. A. M. D. Howes, to No. 11 Sqdn., Netheravon, 20.5.27. W. E. P. Johnson and P. G. Lucas, to No. 43 Sqdn., Tangmere, 11.5.27. F. L. Lawrence, to No. 111 Sqdn., Duxford, 30.5.27. L. G. Martin, to No. 100 Sqdn., Spittlegate, 23.5.27. A. L. Mortimer, to No. 12 Sqdn., Andover, 21.5.27. B. F. O. Smith, to No. 13 Sqdn., Andover, 23.5.27. K. C. Netherton, to No. 16 Sqdn., Old Sarum, 18.5.27. S. Pritchard-Barrett and H. J. G. E. Proud, to No. 16 Sqdn., Old Sarum, 11.5.27. R. H. C. Taylor and E. L. Burslem, to No. 25 Sqdn., Hawkinge, 25.5.27. E. D. Turner, to No. 25 Sqdn., Hawkinge, 23.5.27. W. R. Baird, to No. 13 Sqdn., Andover, 21.5.27. U. S. Mackay, to No. 12 Sqdn., Andover, 24.5.27. J. H. Leach, to School of Balloon Training, Larkhill, 23.5.27.

Pilot Officers: J. Blackmore, A. W. A. Ricks and H. J. Walker, to No. 502 Ulster (Bombing) Sqdn., Aldergrove, 26.5.27.

Stores Branch

Squadron Leader: W. Thorne, to H.Q., Wessex Bombing Area, Andover, 25.5.27.

Flight-Lieutenants: H. J. Payne, to Aircraft Depot, Iraq; 27.4.27. R. V. Robinson, O.B.E., to Supply Services, Iraq; 16.4.27.

Flight Lieutenants: A. J. Briddon, to Home Aircraft Depot, Henlow, 30.5.27. A. J. Roberts, to R.A.F. Depot, Uxbridge, 20.5.27.

Flying Officers: A. S. Berry and W. Best, to Air Ministry, Directorate of Equipment, 16.5.27.

Flying Officers: H. Sleigh, to Station H.Q., Spittlegate, 3.5.27. A. J. Redman, D.F.C., to R.A.F. Base, Gosport, 20.5.27.

Flying Officer: M. H. Jenks, to Home Aircraft Depot, Henlow, 17.5.27.

Pilot Officer E. G. Northway, to No. 11 Sqdn., Netheravon, instead of to R.A.F. Station, Duxford, as previously notified; 1.5.27.

Medical Branch

Squadron Leader J. T. T. Forbes, to H.Q. Coastal Area, 1.6.27.

Flying Officer (Q.-Master, Medical): F. W. Goodhead to R.A.F. Combined Hospital, Iraq, 4.5.27.

Squadron Leader A. J. O. Wigmore, M.B., to No. 1 Flying Training School, Netheravon, 14.6.27.

Flying Officers: E. P. Carroll and G. W. McAleer, M.B., to Research Lab. and Med. Officers' Schl. of Instruction, on appointment to Short Service Commns., 1.6.27.

Chaplains' Branch

Revd. T. Browne, D.D., Ph.D., to H.Q., Cranwell, 1.6.27.

NAVAL APPOINTMENTS

The following appointments were made by the Admiralty on June 8:—

Lieut. (Flying Officer, R.A.F.). C. B. Tidd, to *Columbine*, and for full flying duties in 404 Flight (June 2).

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ROYAL AIR FORCE RIFLE ASSOCIATION

Miniature Rifle League

A GROUP Miniature Rifle League was organised by the above Association at the end of last October, with a view to (*a*) Keeping trained personnel in touch with rifle shooting during the winter months; (*b*) Training young shots; (*c*) To provide a useful service form of recreation throughout the winter; (*d*) To raise the standard of musketry throughout the service.

Messrs. Nobel Industries, Ltd., very kindly presented a valuable beaten-silver cup with 10 silver medals for the winners and 20 bronze medals to be given to the 2nd and 3rd teams.

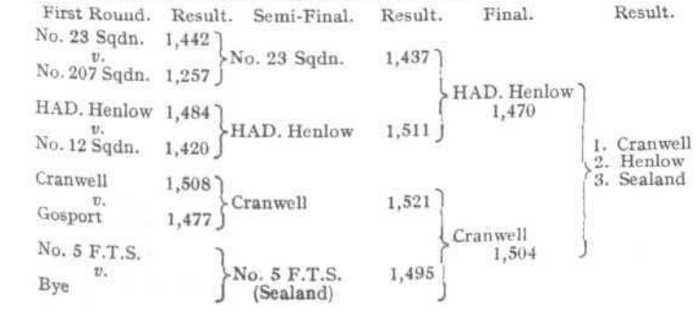
The competition was organised in two stages. In the first stage, the units in each Group shot on the League principle, each team within the Group shooting against each other. The second stage was run on the knock-out principle between the Champion Teams of the Groups.

The following is a list of the Areas and Groups taking part, and the number of teams in each competing in the first stage. :—

No. 10 Group, 3 teams; No. 21 Group, 4 teams; No. 23 Group, 8 teams; Fighting Area, 8 teams; Bombing Area, 9 teams; Cranwell, 4 teams. Making a total of 36 teams.

No. 22 Group could only find two teams, so scratched. No. 10 Group were only able to find three teams, but were allowed to enter their winning team in the second stage. Wessex Bombing Area were allowed to put two teams in the second stage on account of their having the greatest number of entries in the first stage.

The following table shows the winning teams of the first stage, how they were drawn in the second stage and the results:—



The final was witnessed at Henlow by Sqdn.-Leader A. Coningham, D.S.O., M.C., D.F.C., A.F.C., M.B.E., on behalf of Cranwell, and by Sqdn.-Leader J. Kemper, at Cranwell, on behalf of Henlow.

Winners:—Cranwell. Score, 1,504.

Name.	Slow.	Rapid.	Total.
F/L. R. S. Greenslade ..	96 ..	100 ..	196
F/O. E. C. Delamain, M.C.	93 ..	97 ..	190
F/Sgt. C. H. Spry	95 ..	93 ..	190
Cpl. A. W. Hulse	93 ..	97 ..	190
F/L. J. L. K. Pearce, O.B.E.	93 ..	95 ..	188
L.A.C. S. M. Davies ..	93 ..	92 ..	185
Sgt. F. C. J. Fry	88 ..	95 ..	183
F/L. F. H. Ronksley, M.C.	87 ..	95 ..	182
		Total ..	1,504

Captain and Coach, F/Sgt. F. A. Holden.

Runners-up:—Henlow. Score, 1,470.

Name.	Slow.	Rapid.	Total.
L.A.C. C. Wills	97 ..	96 ..	193
L.A.C. C. H. Sexton ..	92 ..	94 ..	186
Cpl. J. Symonds	94 ..	91 ..	185
F/L. A. S. Thompson ..	91 ..	92 ..	183
P/O. A. A. Quayle	90 ..	93 ..	183
A.C. S. Suttle ..	89 ..	93 ..	182
L.A.C. O. H. McNair ..	94 ..	87 ..	181
A.C. A. E. Pearce ..	93 ..	84 ..	177
		Total ..	1,470

Captain and Coach, S./Ldr. J. Kemper, M.B.E.

No. 5 F.T.S. secured third place owing to their very high average in the first stage, and on account of their score in the second stage being the highest apart from the winners and runners-up.

The Cup and Medals will be presented by the Chief of the Air Staff at Bisley, on Thursday, the 1st July, 1927.

IN PARLIAMENT

Irish Air Mail Service

LIEUT.-COMMANDER KENWORTHY, on June 14, asked the Postmaster-General whether he has considered the carriage of the mails to Ireland, and especially to the North of Ireland, by aeroplane; and why aeroplanes are not being utilised?

Sir W. Mitchell-Thomson: Mails were carried to Northern Ireland in 1924 by a commercial air service which is not now in operation. If a service were established again, I should be prepared to consider the use of it for mails; but it would be necessary to charge a special fee, and it is doubtful whether the acceleration would be sufficient to attract much traffic.

Lieut.-Commander Kenworthy: Would not this do away with all the trouble about the Northern Ireland mails being carried through Free State territory?

Sir W. Mitchell-Thomson: If the hon. member will look at the Interim Report of the Committee, which was published two years ago, he will find the subject fully discussed there.

Air Organisation

COMMANDER BELLAIRS, on June 16, asked the Secretary of State for Air whether, in view of the fact that the Report of the Morrow Committee in America in favour of retaining the organisatiin of separate naval and military air forces and making civil aviation entirely independent of military control has been accepted by Congress, he will cause copies of the Report and evidence to be placed in the Library?

Sir Philip Sassoon: As the Report of the so-called "Morrow" Committee, in discussing the air organisation which is in their view most suitable for the United States at the present time, explicitly drew attention to the different circumstances in Great Britain, it would not appear that any useful purpose would be served by placing copies of this Report and of the evidence taken before the Committee in the Library.

Commander Bellairs: Why does the Secretary of State for Air object to any information being furnished to this House. Seeing that this was a very full inquiry, why should not Members of this House have the benefit of seeing the Report as we have had no public inquiry of any kind into air affairs in this country?

Sir P. Sassoon: If there be a wide-spread desire that the document should be placed at the disposal of hon. Members—I do not think there is—my right hon. Friend will be only too willing to see that it is made available to Members, together with the subsequently published Report of the Congress Select Committee, which contains much striking information with regard to overlapping, lack of co-ordination, and so on.

Royal Air Force Long Distance Flights

VISCOUNT SANDON, on June 13, asked the Secretary of State for Air whether any conclusion has been drawn from the success of Capt. Lindbergh's transatlantic flight as to the relative merits of the design of his monoplane for long-distance flight as compared with that of aeroplanes used for such purposes in this country; and, if so, whether any steps are being taken to profit by such experience?

Sir Philip Sassoon: Capt. Lindbergh's achievement has been noted with admiration and interest. The merits of the monpolane for long-distance flight are well-known to aircraft designers, and this type will no doubt be considered for any aircraft in which extreme range is the main consideration. The aircraft used in the recent long-distance flights by the Royal Air Force have in all cases been Service machines, in the design of which factors other than range have to be taken into account.

Viscount Sandon: Does the same thing apply to the Chamberlin flight to Berlin?

Sir P. Sassoon: We have not had an opportunity of examining their machine.

Capt. Garro-Jones: Is it not a fact that, under the Air Ministry Regulations, this particular type of machine would be condemned as not being air-worthy, owing to the restricted field of vision forward; and if that be so, will the Ministry alter the Regulations?

Sir P. Sassoon: I must have notice of that question.

Cairo-Cape Empire Air Route

CAPT. MACMILLAN asked (1) the Secretary of State for the Colonies whether the question of the Khartoum-Kisumu section of the Cairo-Cape Empire air route will be discussed at any meeting of the Colonial governors who are interested and who are now in this country;

(2) Asked the Secretary of State for Air whether he can make any statement defining the Government's attitude with regard to the Khartoum-Kisumu section of the Cairo-Cape Empire air route?

Mr. Amery: My right hon. Friend the Secretary of State for Air has asked me to answer the question addressed to him together with this question. A meeting has been held with the representatives of the Governments concerned, but the matter must be referred to those Governments before any decision can be taken.

The home Government is most anxious to support the scheme by any means in its power, but no announcement is possible at present.

* * * *

Lindbergh's Magneto

WE learn from Scintilla, Ltd., a very interesting fact regarding the technical side of Col. Lindbergh's recent Atlantic flight. We mentioned previously, we think, that the Wright "Whirlwind" engine in the Ryan monoplane was equipped with "Scintilla" *magnetos*. We now learn that while the "Whirlwind" is provided normally with two magnetos, during Lindbergh's flight only *one* standard "Scintilla" was used. Unfortunately, at the moment, we have no other details regarding this remarkable fact, which is certainly an excellent proof of the "Scintilla's" reliability.

Royal Air Force Flying Accidents

THE Air Ministry regrets to announce that as the result of an accident at Marsa Scirocco, Malta, to a Fairey "Flycatcher" machine of No. 402 Flight, on June 9, Haydon Marriott Sutherland Forbes, D.S.C., Lieutenant-Commander, Royal Navy, Flying Officer, Royal Air Force, the pilot and sole occupant of the aircraft, was killed.

As the result of an accident at Stamford to a Sopwith "Snipe" of the Central Flying School, Wittering, on June 16, Flight-Lieut. Humphrey William Baggs, the pilot of the aircraft, and Flying Officer Sydney Fleetwood Bell, were killed.

IMPORTS AND EXPORTS, 1926-1927

AEROPLANES, airships, balloons and parts thereof (not shown separately before 1910).

For 1910 and 1911 figures see FLIGHT for January 25, 1912.

For 1912 and 1913, see FLIGHT for January 17, 1914.

For 1914, see FLIGHT for January 15, 1915, and so on yearly, the figures for 1926 being given in FLIGHT, January 20, 1927.

	Imports.		Exports.		Re-Exports.	
	1926.	1927.	1926.	1927.	1926.	1927.
	£	£	£	£	£	£
Jan. ..	494	1,850	130,049	49,021	—	—
Feb. ..	2,089	679	40,416	63,080	6,341	—
Mar. ..	1,001	7,087	92,840	106,478	9,758	2,270
Apr. ..	536	822	160,832	71,190	5,051	785
May ..	342	1,258	118,539	82,708	—	640
	4,462	11,696	542,676	372,479	21,150	3,965

* * * *

PUBLICATIONS RECEIVED

Aeronautical Research Committee Reports and Memoranda: *No.* 1062 (*E.* 23).—Dopes and Detonation: Second Report. By Prof. H. L. Callendar, C.B.E. December, 1926. Price 1*s.* 3*d.* net. *No.* 1069 (*Ae* 251).—On a Modification of the Chattock Gauge, designed to Eliminate the Change of the Zero with Temperature. By W. J. Duncan, B.Sc. December, 1926. Price 6*d.* net. H.M. Stationery Office, Kingsway, London, W.C.2.

The Air Pilot Monthly Supplement. No. 31. *May*, 1927. Air Ministry, Kingsway, London, W.C.2.

Technical Note No. 256. *Wall Interference in Closed Type Wind Tunnels. By George J. Higgins.* March, 1927. National Advisory Committee for Aeronautics. Washington, D.C., U.S.A.

* * * *

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* * * *

AERONAUTICAL PATENT SPECIFICATIONS

(*Abbreviations*: Cyl. = cylinder; i.c. = internal combustion; m. = motor. The numbers in brackets are those under which the Specifications will be printed and abridged, etc.)

APPLIED FOR IN 1925

Published June 23, 1927

32,026. P. SCHILOVSKY. Fixing gyroscopic turning-indicators in aerial navigation. (271,528.)

APPLIED FOR IN 1926

Published June 23, 1927

17,341. V. HAGGER. Cowling. (271,673.)
18,223. GOODYEAR-ZEPPELIN CORPORATION. Airships. (256,219.)
18,236. H. G. HAWKER ENGINEERING CO., LTD., and C. L. COWDREY. Mountings for course-setting bomb sights. (271,679.)
18,814. F. J. W. and P. A. PURTON. Sustentation or propulsion of aircraft. (271,682.)
23,537. NORDDEUTSCHE KUHLERFABRIK AKT.-GES. Radiators. (258,888.)
24,006. M. HURLIMANN, JUN. Glider aeroplanes. (271,702.)
25,099. G. DE MONGE. Shock-absorber. (259,603.)

APPLIED FOR IN 1927

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7,074. PYRENE CO., LTD. Low freezing-point solutions. (267,561.)
7,203. H. JUNKERS. Charging-pumps for i.c. engines. (269,502.)

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